INDUSTRIAL MEDICINE

Industrial Health, Occupational Medicine and Traumatic Surgery

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Thioglycolic Acid and Thioglycolates
— Physiologic Properties —

Study of Absenteeism
— Following Influenza "A" and "B" Vaccination —

The Amputation Stump
— Reconstruction for Weight Bearing —

Edrisal
— In the Management of Dysmenorrhea —

Paraprol as a Prophylactic
— In Nickel Dermatitis and Chrome Sores —

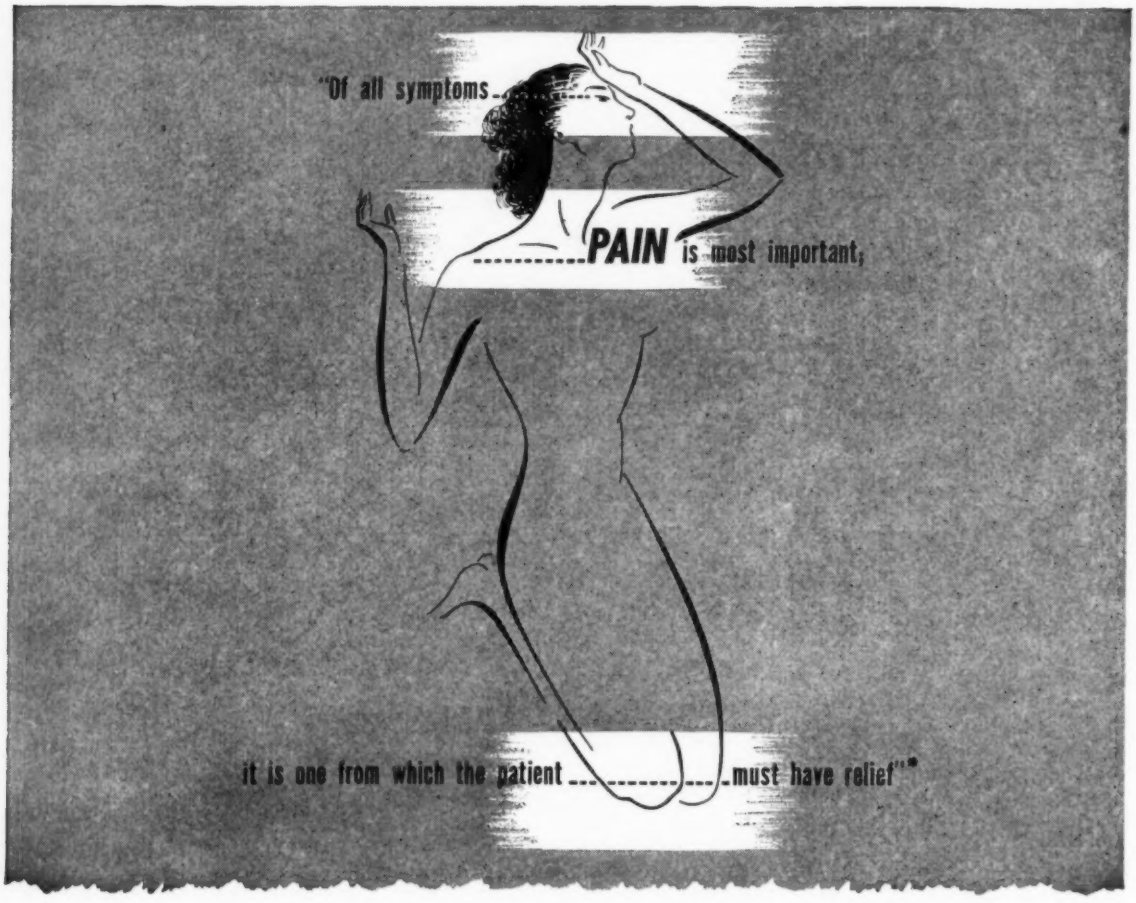
Fractures of the Radius and Ulna
— Commonly Classified as Colles' Fractures —

Medical Service in Industry
— Revised Manual, American College of Surgeons —

The Common Eye Injuries
— In an Industrial Plant —

Lowering Personnel Turnover
— A Mutual Must of the Industrial Health and Industrial Relations Services —

Volume 15 Number 12



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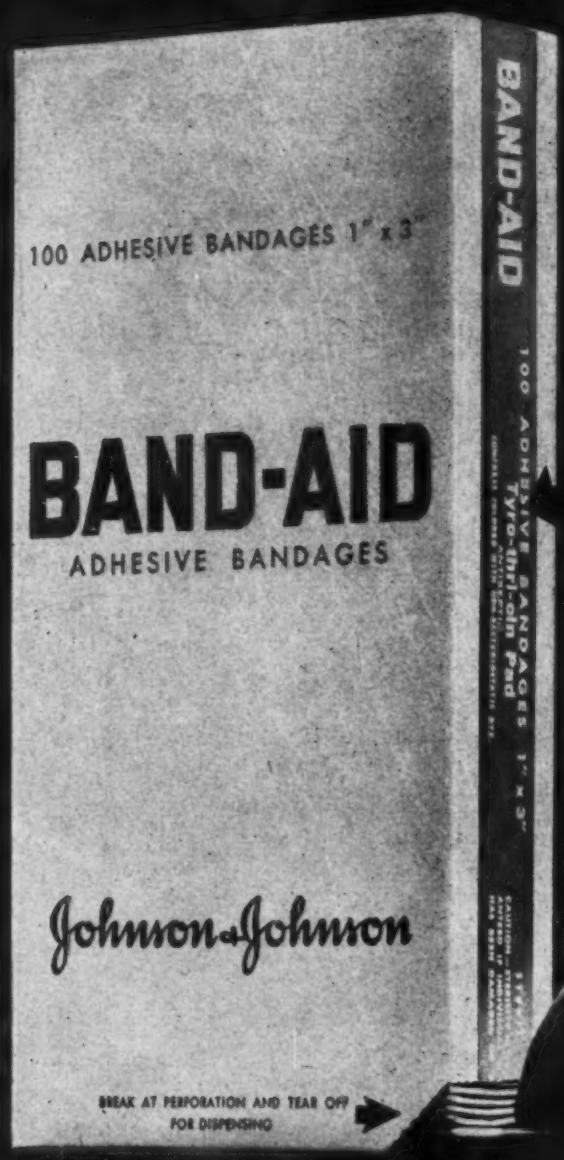

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Industrial Medicine | Volume 15 | DECEMBER, 1946 | Number 12 | Industrial Medicine

This Month

THIOGLYCOLIC ACID and Thioglycolates.....*Carey P. McCord, M.D.* 669
—Physiologic Properties
STUDY of Absenteeism .....*M. N. Newquist, M.D.* 676
—During a Five-Month Period Following Influenza "A" and "B" Vaccination (With *R. C. Page, M.D., F.A.C.P.*)
THE AMPUTATION STUMP .....*Douglas D. Toffelmier, M.D.* 677
—Reconstruction for Weight Bearing
EDRISAL .....*Charles-Francis Long, M.D.* 679
—In the Management of Dysmenorrhea
PARAPROL as a Prophylactic.....*R. P. Scott, M.D.* 681
—And as a Therapeutic Agent in Nickel Dermatitis and Chrome Sores
LOWERING Personnel Turnover.....*Jean Spencer Felton, M.D.* 682
—A Mutual Must of the Industrial Health and Industrial Relations Services
FRACTURES of the Radius and Ulna.....*Wm. Johnson, M.D.* 685
—Commonly Classified as Colles' Fractures (With *B. E. Malstrom, M.D.*, and *E. G. Behrents, M.D.*)
MEDICAL SERVICE in Industry 688
—Revised Manual: American College of Surgeons
"VARICOSE Ulcer" .....*Otto Meyer, M.D.* 689
—The Fallacy of the Term
EDITORIAL 690
INDUSTRIAL HEALTH and DISEASE:
Common Eye Injuries.....*Leonard W. Jones, M.D.* 692
Cobalt .....*Lawrence T. Fairhall* 694
Union Health Center.....*Pauline M. Newman* 696
BOOKS:
Industrial Toxicology 698
Nursing in Commerce and Industry..... 698
Personal .....8 Dr. Pilgrim 7
Comment and Opinion 700

COMING

MINOR ILLNESS, Short Medical Absenteeism, Lateness and Separation in a Mail Order Firm by *Louis P. Hellman, M.S.*, and *Keeve Brodman, M.D.*

MEDICAL DEPARTMENTS in Small Plants: Layout, Equipment and Cost by *Nathan Millman, M.D.*

OCCUPATIONAL Lead Absorption: A Study of Cases Observed Among Jamaica Negroes by *William C. Wilentz, M.D.*, and *Charles Molcsan, M.T.*

CASES of Chronic CS_2 Poisoning in the Viscose Industry by *Professor Enrico Vigliani*

HYDROFLUORIC ACID Burn: Case Report by *Agnes N. Flack, M.D.*, and *Paul D. Schofield, M.D., F.A.C.S.*

DR. CAREY P. MCCORD, whose article on "The Physiologic Properties of Thioglycolic Acid and Thioglycolates" (page 669) leads off this issue is well known to readers of INDUSTRIAL MEDICINE. In the certain event that his article comes to the attention of others interested in the subject matter, it should be said that DR. MCCORD'S career is briefed on page 1558 of the current "Who's Who in America," 1946-1947. Reprints of this study will be available. . . . THE review of 110 cases of skeletal pinning and external fixation, by DRS. JOHNSON, MALSTROM and BEHRENTS, in "Fractures of the Radius and Ulna," (page 685) was given at the Seventh Annual Meeting of the AMBULATORY FRACTURE ASSOCIATION, at Galesburg, Illinois, on November 14-16, 1946. . . . THE new A.C.S. Manual of Medical Service in Industry (page 688) is a reading "must". . . .

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Becton, Dickinson & Co....698
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Bischoff, Ernst, Company....693
Diatussin
Breck, John H., Inc....31
"Merry Christmas"
Bristol-Myers Company....697
Trushay
Bristol-Myers Company....705
Sal-Hepatica
Burdick Corporation, The....35
Burdick Muscle Stimulator
Burnham Soluble Iodine Co....7
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Foille-Flat
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Denver Chemical Mfg. Co., Inc....706
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Desitin Ointment
Dome Chemicals, Inc....700
Domeboro Tabs; Domolene
Du Pont....11
Patterson Screens
General Cellulose Co., The....704
S'Wipe's
Hynson, Westcott & Dunning, Inc....707
Thantis Lozenges
Iodine Educational Bureau, Inc....709
Iodine
Johnson & Johnson....1
Tyrothricin Band-Aid
Johnson & Johnson....18
Adaptic Elastic Bandage
Johnson & Johnson....34
Back Plasters
Keystone View Company....710
Industrial Visual Safety Tests
Kny-Scheerer Corporation....24
Surgical Instruments
Leeming, Thos., & Co., Inc....694
Baume Bengue
Lilly, Eli, and Company....36
'Seconal Sodium'
Lily-Tulip....7
Paper Cups
Macalaster Bicknell Company....27
Fenwal Equipment
Machlett Laboratories....17
Dynamax Tubes
McNeil Laboratories, Inc....2nd Cover
Aspirocal
Merck & Co., Inc....691
Puridium
Mine Safety Appliances Company....25
Chemox Oxygen Breathing Apparatus
National Confectioners' Association....19
Candy
New York Pharmaceutical Company....704
Hayden's Viburnum Compound
Numotizine, Inc....692
Numotizine
Nutrition Research Laboratories....32, 33
Ertron
Occy-Crystine Laboratory....4
Occy-Crystine
Owens-Corning....14
Fiberglas
Parke, Davis & Company....5
Tyrothricin
Patch, The E. L., Company....710
Gadoment
Picker X-Ray Corporation....2
Picker "Century" Units
Powers X-Ray Products, Inc....29
X-Ray Paper
Rees-Davis Drugs, Inc....7
Hydrosulphosol
Reynolds, R. J....695
Camel Cigarettes
Schenley Laboratories, Inc....9
Penicillin
Sharp & Dohme....15
'S.T.37' Antiseptic Solution
Sharp & Dohme....30
'B.F.I.' Powder
Shield Laboratories....701
Riasol
Upjohn....23
Cebefortis Tablets
United States Savings Bonds....6
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War Assets Administration....699
Litters and Litter Carriers
West Disinfecting Co....20, 21
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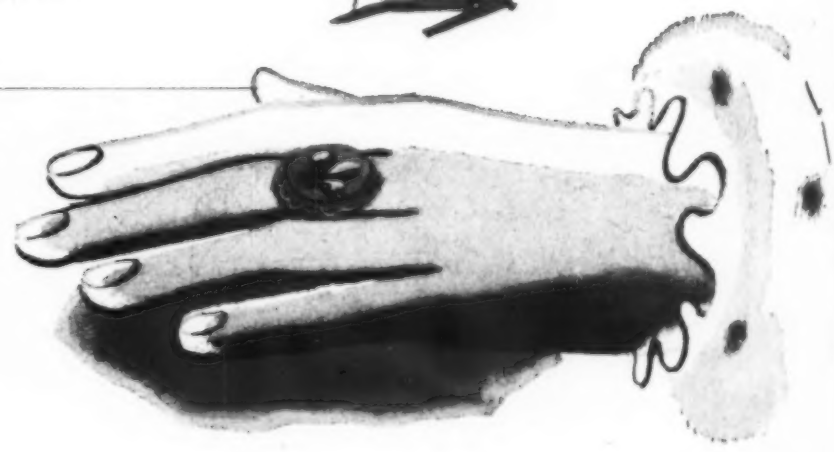

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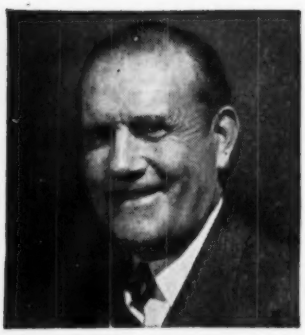

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MORNING SESSION: "Pathological Conference"—EDWIN F. HIRSCH, M.D., Director, Department of Pathology, St. Luke's Hospital.

"Presentation of Cases and Reports"—Members of St. Luke's Hospital Staff: WILL F. LYON, M.D., BURTON C. KILBOURNE, M.D., CARLO S. SCUDERI, M.D., HARRY E. MOCK, SR., HARRY E. MOCK, JR.

AFTERNOON SESSION: MELVIN L. HOLE, M.D., presiding:

"Industrial Hernia"—WILL F. LYON, M.D., Assistant Professor of Surgery, U. of I. College of Medicine; Chief Surgeon, International Harvester Co.

"Scrotal Swellings in Industrial Practice"—JOSEPH H. KIEFER, M.D., Head, Department of Urology U. of I. College of Medicine.

"The Symptomatic Varicocele"—WILLIAM E. MOCK, JR., M.D., Assistant in Surgery, Northwestern University Medical School.

"Mental Problems in Industry"—FRANCIS J. GERTY, M.D., Professor and Head, Department of Nervous and Mental Diseases, U. of I. College of Medicine.

EVENING SESSION: MELVIN L. HOLE, M.D., presiding:

"Functional Disorders of the Foot in Relation to Industrial Efficiency"—FRANK D. DICKSON, M.D., Associate Professor of Clinical Surgery U. of Kansas School of Medicine, and Rex L. Dively, M.D., Kansas City, Missouri.

DR. PILGRIM

TO THE train to meet DR. RONALD E. LANE, of the Department of Industrial Health, University of Manchester (England), and then for a between-trains sightseeing ride around Chicago, then to the South Shore Country Club for dinner, and much interested to hear of teaching methods in Great Britain, where in some respects they appear to be more advanced than ourselves. . . . AND working on many manuscripts and papers and in preparation for a progress report on a recent survey for the Industrial Hygiene Foundation; And concerned with a number of compensation cases and similar problems; and, in the midst of many things to do, much distressed by the untimely passing of ROY GARDNER, whose life was filled with many accomplishments, with always a helping hand for anyone who needed it. . . . AND then a short journey to a local printing plant where there were problems concerning air contamination, not easily solved, but with much discussion and reporting of alternatives. . . . AND to another plant for monthly examinations, where there is a lead exposure. . . . AND again at the meeting of the Industrial Hygiene Sub-committee with reference to the industrial hygiene portion of the recent survey of Chicago-Cook County Health facilities, sitting with DRS. HOLMBLAD, SLOBE, FLINN, PETERSON, and MESSRS. COOK, MORSE and HEWITT. . . . THEN enroute to Clarksburg, West Virginia, for the annual meeting of the State Nurses Association, being met at Connellsville, Pennsylvania, by NURSE M. E. INGOLDSBY, and riding through the West Virginia hills, admiring the pot-

—Continued on page 708.

Industrial Medicine

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Industrial Medicine

American Association of industrial Physicians and Surgeons

THE object of this Association shall be to foster the study and discussion of the problems peculiar to the practice of industrial medicine and surgery; to develop methods adapted to the conservation of health among workers in the industries; to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for their mutual advancement in the practice of their profession.

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PERSONAL

DR. JAMES H. MCDONOUGH has been awarded a James S. Kemper Foundation Fellowship in Industrial Medicine at the School of Medicine, University of Pittsburgh. DR. MCDONOUGH was graduated from the University of Pennsylvania in 1942. He was Senior Assistant Surgeon, U. S. Public Health Service, assigned to duty with the U. S. Coast Guard for the past three years.

DR. RICHARD A. SCHOFIELD, of Sacramento, California, Past President of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, on October 18 arranged for the organization of a Regional Sectional Group of Industrial Surgeons at Seattle, Washington, who are to become members of the WESTERN ASSOCIATION.

PROFESSOR HAROLD B. GOTASS, formerly Professor of Sanitary Engineering at the University of North Carolina, and a Colonel in U. S. Army Corps of Engineers in World War II, has been appointed Professor of Sanitary Engineering and Industrial Hygiene in the School of Public Health, University of California, Berkeley, California.

THE President of the University of California at Berkeley, California, has announced the appointment in the new School of Public Health, of DR. LEON LEWIS as Associate Professor of Industrial Health. PROFESSOR LEWIS received his B.S. degree at the University of Washington and his M.D. at University of Pennsylvania. He is a Diplomate in internal medicine, and has been an instructor in medicine at Cornell Medical School, New York City. For 10 years he carried on a consultation practice and diagnostic laboratory in Newark, New Jersey, and became consultant in industrial medicine and toxicology, and plant physician for 11 industries and three life insurance companies. During the war he served as Lieutenant Commander M.C.U.S.N.R., serving as Director of the laboratory at the U.S.N. Hospital N.O.B., Norfolk, Virginia, and as Senior Medical Officer, Military Government Research Center, Okinawa, Japan.

DR. RONALD E. LANE, the first Professor of Industrial Health at the University of Manchester, England, on an official tour of the United States, spent 12 busy days in the San Francisco Bay area and in Los Angeles, where he was entertained

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(2) Morse, F. W.: J. A. M. A. 132: 272 (Oct. 5) 1946; (3) Segal, M. S., and Ryder, C. M.: Bull. New England M. Center 7: 279 (Dec.) 1945.

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(4) Finland, M.; Meads, M., and Ory, E. M.: J. A. M. A. 129: 315 (Sept. 29) 1945; (5) Collen, M. F.; et al.: Permanente Found. M. Bull. 3: 155 (Oct.) 1945.

SCHENLEY LABORATORIES SERVICES:

1. Penicillin Paragraphs for December, dealing with pneumonia, has been mailed to all physicians.
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and shown about the educational and research laboratories, industrial plants, hospitals and clinics where industrial health is taught and practiced. A banquet was given in his honor in San Francisco, where about 30 prominent industrial physicians and scientists attended. The San Francisco committee of arrangements consisted of DR. ROBERT T. LEGGE, Chairman, DRS. W. P. SHEPPARD, SYDNEY GARFIELD, J. M. MCCULLOUGH, WILLIAM G. DONALD, LEON LEWIS and C.E. SMITH. The Los Angeles committee of arrangements included DR. RUTHERFORD T. JOHNSTONE, chairman, DRS. JOHN D. BALL, BEN M. FREES, ALFRED C. DICK, J. W. SHELLING and LIN D. CHENEY.

MR. KANJI DWARKADAS, of Bombay, India, was a guest of the Industrial Hygiene Division, U. S. Public Health Service, recently, in a tour of industries and governmental offices concerned with the health and welfare of workers. Mr. Dwarkadas is the Labor and Welfare Officer of the India United Group of Mills which employs 19,000 workers. The majority of these workers are women. One out of four takes her children to the modern nursery provided by the plant. Complete medical service is another facility offered to employees and their families. These mills are highly unusual in that they provide health and hazard protection for their workers.

—*Industrial Hygiene Newsletter*, October, 1946.

GENERAL

Isolation of Tuberculosis

THE health regulation entitled, "Isolation of Recalcitrant Tuberculosis Patients," was prepared by a committee appointed by the State Health Commissioner at the Semi-annual meeting of the State (Advisory) Board of Health, held July 9, 1946. This regulation has been approved by members of the Advisory Board and is now part of the Rules and Regulations of the Iowa State Department of Health. It was drawn up at the request of various health officers, private physicians and health organizations within the State. Isolation can be applied to the patient who refuses sanatorium treatment or who returns from the sanatorium before treatment has been completed; also to the open case of pulmonary tuberculosis (one with positive sputum), when the patient does not conform with the restrictions of the State Department of Health or local Board of Health in matters relating to protection of others. This regulation should apply only to the patient who is a distinct menace to the public through failure to cooperate in observance of health precautions. "Pulmonary tuberculosis is an infectious and communicable disease, dangerous to the pub-

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lic health whenever tubercle bacilli are present in the sputum and proper precautions are not taken to prevent the spread of infection. A person ill with tuberculosis who neglects or refuses to obey the restrictions of the State Department of Health or the local health officers in matters relating to the protection of others against the disease, shall be placed under isolation in a suitable dwelling and shall not be permitted to leave such residence until such time as the danger of infecting others no longer exists. A placard may be posted on premises where a recalcitrant patient is under isolation, such notice to read as follows: 'WARNING: TUBERCULOSIS EXISTS ON THESE PREMISES.' Penalty: Any person who knowingly violates any provisions of this chapter, or the rules of the state department or the local board, or any lawful order, written or oral, of said department or board, or of their officers or authorized agents, shall be guilty of a misdemeanor. (Section 139.32, Code of Iowa, 1946.)"

Sight Conservation Program

AN INDUSTRIAL Sight Conservation Program is being sponsored by the New Jersey State Department of Health. DR. J. LYNN MAHAFFEY, State Director of Health, has assigned the development of the plan to the Division of Adult and Industrial Health, with DR. HERBERT WELTCHEK, of Elizabeth, in charge. According to DR. WELTCHEK, the plan contemplates visual testing of employees, to be followed by vision correction where needed; job analysis for properly placing employees in work where their visual capabilities can best be used; color and lighting analysis of working areas, to be followed by recommendations for proper painting and illumination; analysis of hazards, such as chemical fumes or solutions; and opthalmological consultation.

—*Hawthorne, New Jersey, Press*, November 7, 1946.

"Health Hazard" Dispute

THE possibility of a strike at the Ford Motor company's Big Rouge plant over the so-called "health hazard" dispute was near an end today. Workers had objected to use of sodium fluoride in steel making, contending it endangered their health. President Thomas Thompson, of the CIO United Auto Workers' Ford local 600, announced union heads would recommend approval of an agreement at a membership meeting tomorrow. The meeting, originally called for a formal strike vote, will get a proposal under which all health issues will be submitted to company-union negotiators, Thompson said. If they are unable to agree after 15 days, the question will go to the Ford-union contract's impartial umpire.

—*Chicago Sunday Tribune*, November 17, 1946.

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Trauma and Nitrogen Equilibrium

Recent recognition of the direct relationship between trauma and protein loss has greatly improved the prognosis in postsurgical and post-trauma patients.

Striking and hitherto unsuspected protein loss has been observed in patients with fractures. Excessive urinary nitrogen excretion reaches its maximal point about a week after the injury is sustained, and thereafter slowly diminishes in extent, so that nitrogen balance is restored in approximately four weeks.[1]

In patients sustaining severe burns, the daily protein loss may be equivalent to 400 cc. of plasma.[2]

In a study embracing 23 burned patients, nitrogen balance determinations revealed excessive urinary nitrogen excretion. Nearly all patients were in negative nitrogen balance which was most marked during the first ten days.[3]

It thus appears that protein destruction and loss are prominent and potentially detrimental sequelae of trauma, and that every effort must be made to restore nitrogen equilibrium as quickly as possible to prevent the many deleterious consequences of protein depletion. The recommendation has been voiced that "whenever possible, protein losses or deficiencies should be corrected by oral feeding."[4]

Among the protein foods of man, meat ranks high not only because of the generous supply of protein it provides, but also because its protein supplies all the essential amino acids, making it applicable for every protein need—growth, tissue maintenance, and tissue repair.

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1 Howard, J. E.: Bull. Johns Hopkins Hosp., 74:313 (May) 1944.

2 Co Tui, C.; Wright, A. M.; Mulholland, J. H.; Barcham, T., and Breed, E. S.: Ann. Surg. *119*:815-823 (June) 1944.

3 Hirshfeld, J. W.; Abbott, W. E.; Pilling, M. A.; Heller, C. G.; Meyer, F.; Williams, H. H.; Richards, A. J., and Obi, R.: Arch. Surg. 50:194 (Apr.) 1945.

4 Lund, Chas. C., and Levenson, S. M.: J. A. M. A. *128*:95 (May 12) 1945.

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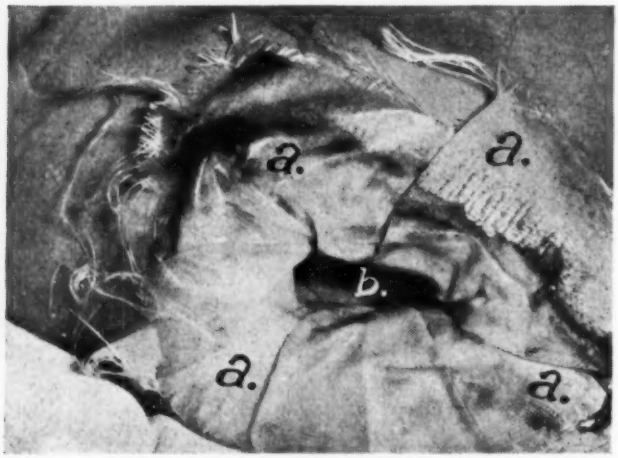
Fiberglas materials have been shown to be uniquely suited to certain medical uses through their experimental applications by physicians, surgeons and others engaged in medical research.

The quest for an ideal packing material for postoperative care of compound wounds, for example, was based upon a number of qualifications.

ESSENTIAL FACTORS

Such an improved dressing must allow proper drainage and granulation of the wound so that an early split-skin graft can be applied if desired. It should be non-irritating to the skin and should not act as a foreign body if left embedded in human tissues. It should prevent adherence of granulations and prevent exuberant granulation. It should not cause pain or excessive bleeding on removal, and should be simple to prepare and use.



United States Army Signal Corps Photo.

Shoulder wound, three weeks after saucerization of the cavity. (a) Fiberglas Cloth may be seen on the wound surfaces. (b) No granulations are growing through the meshes.

After consideration of these factors, Fiberglas Cloth was tried experimentally at the Percy Jones General Hospital, Battle Creek, Mich., in thirty-five cases where ordinarily petrolatum-impregnated gauze would have been used.

METHOD OF APPLICATION

In applying the dressing at the time of surgery, a square of glass cloth is cut large enough to cover all surfaces of the wound and to project over the skin margin. The center of the invaginated glass cloth should be packed with dry cotton gauze to hold open the edges of the wound and to act as a wick to remove exudate. A pressure bandage or padded cast, as indicated, is placed over such a dressing.

These Fiberglas dressings were left in the wound for varying periods of time. The report in the *Journal of Bone and Joint Surgery** says, "contra-indications have not been observed". Fiberglas Cloth was also tried as the first layer of a wet dressing for a split-skin graft. By such experimentation, the uses of Fiberglas in medicine are being established.

United States Army Signal Corps Photo.

The same wound (a) after removal of Fiberglas Cloth, showing clean granulations and no bleeding or thick exudate.

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*Vol. 28, No. 1, pp. 180-181, January, 1946.

Some Other Uses of Fiberglas in Medicine

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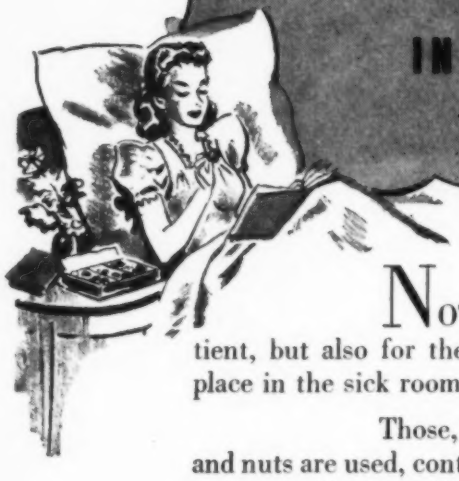

NOT only because of the "psychic lift" they give the patient, but also for their nutrient value, do many kinds of candy merit a place in the sick room.

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3. Those candies, in the manufacture of which milk, butter, eggs, fruits, nuts, or peanuts are used, to this extent also—
   (a) provide biologically adequate protein and fats rich in the unsaturated fatty acids;
   (b) present appreciable amounts of the important minerals calcium, phosphorus, and iron;
   (c) contribute the niacin, and the small amounts of thiamine and riboflavin, contained in these ingredients.
4. Candies are of high satiety value; eaten after meals, they contribute to the sense of satisfaction and well-being a meal should bring; eaten in moderation between meals, they stave off hunger.
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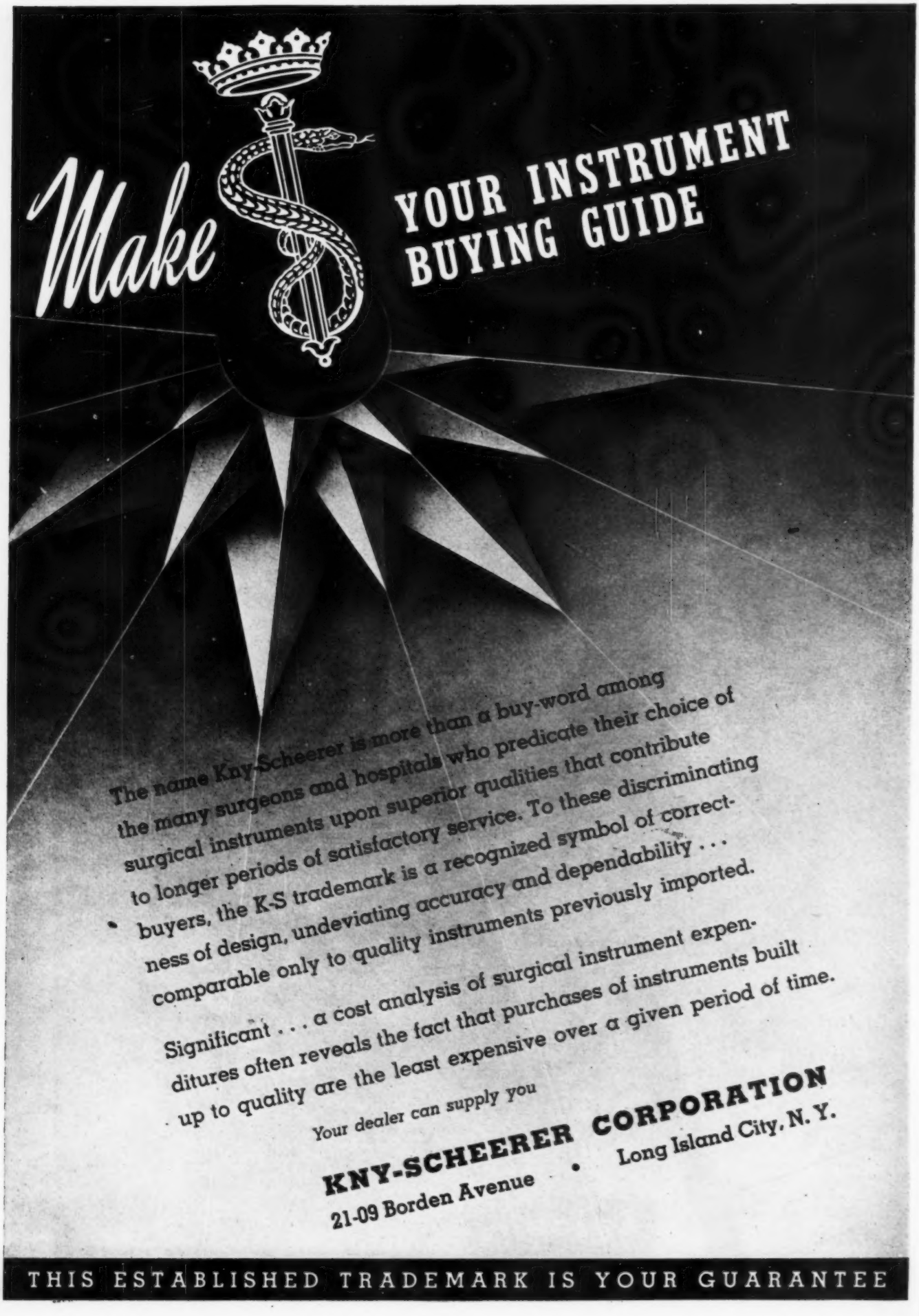
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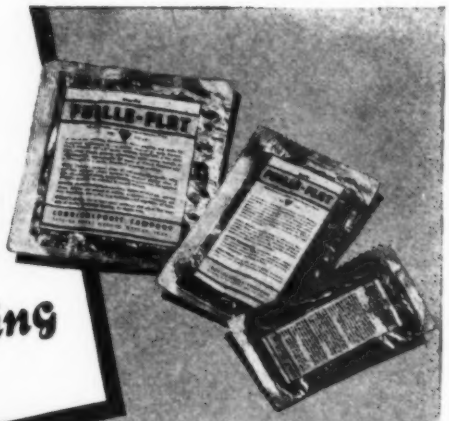

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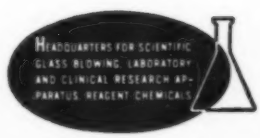

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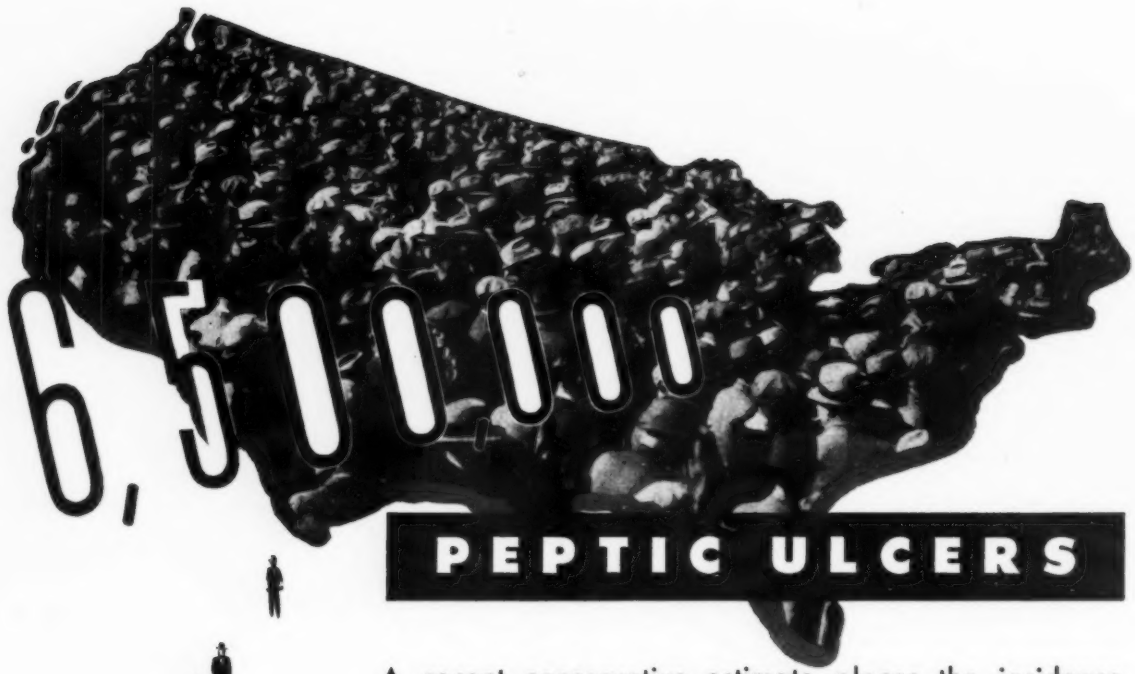

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*Bureau of Health Education, A.M.A. *Hygeia*, 24:352, May, 1946.

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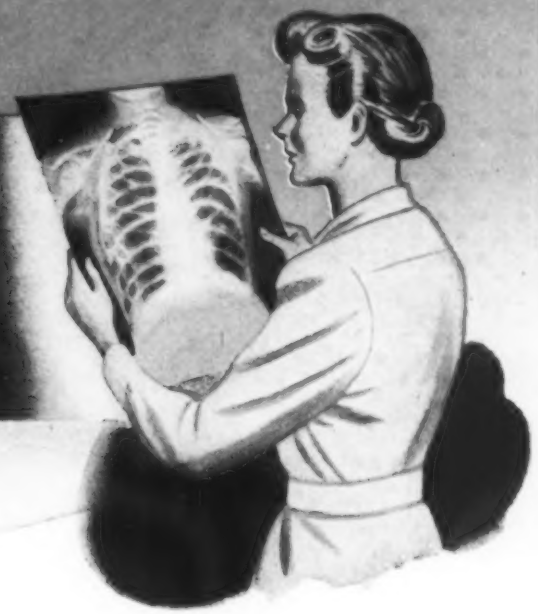

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Industrial Medicine

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The Journal of Industrial Health, Occupational Medicine and Traumatic Surgery

With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery."

The Science, the Law and the Economics of Industrial Health

Volume 15 December, 1946 Number 12

The Physiologic Properties of Thioglycolic Acid and Thioglycolates

CAREY P. McCORD, M.D.,
Detroit, Michigan

THIOGLYCOLIC ACID, although discovered by Carius in 1862, only within the past five years has thrust itself, in the form of thioglycolates, into the range of activities of the industrial hygienist. Because of their action on hair (human and animal), the thioglycolates have achieved prominence, and chiefly so in the procurement of artificial curling of human hair ("permanent waving"), and artificial straightening of hair. These hair modifications call for different procedures, possibly embracing use of ancillary chemicals as primers, neutralizers, and fixatives, thus complicating hygienic appraisals.

Apart from entry into the cosmetic field, thioglycolic acid and possibly thioglycolates have found application in the following enterprises, among others: to promote solubility of rubber in alkali solutions, to promote starch hydrolysis, to intensify the fermentation of baker's yeast, to de-toxify snake venom, and to stimulate rapid growth of seedlings in horticultural industry. In the medical sciences thioglycolic acid finds numerous small employments such as in the treatment of syphilis with sodium bismuth thioglycolate; as an adjuvant to atoxyl; as a reagent in the quantitative analysis of fats; in the preservation of the virus of certain plants; and is a constituent of several bacterial growth media.

Women, beginning at an age near 15, provide a continuing patronage for "permanent" hair waving, if Caucasian, together with hair straightening in smaller numbers of Negroes. This patronage is either for beauty shop services or for substances designed for home application for such hair modifications. "Permanents" for children are becoming increasingly common.

It is estimated that yearly 55,000,000 (approximation) permanent waves are secured. For the women who favor this beauty effort, the yearly average is near three. At once it is observed that all such practices may represent deviation from nature's plans and constitute a mild degree of nature faking. To avoid protest, it may also be observed that this indignity to the natural is perhaps no greater than man's matinal pogonotomy, since nature perhaps designed that all men should be bearded.

From The Industrial Health Conservancy Laboratories, Detroit, Michigan.

A mighty benefaction springing from hair is its patient capacity (with all too many distressing exceptions) to replace itself, for no form of hair modification, such as bleaching, dyeing, permanent waving, is wholly harmless. The greater the number, the higher is the prospect of hair damage on the basis of cumulative hair protest over these physiologic affronts. While this is true, the provider of the last preceding "service" is prone to be the victim of woman's wrath when ultimately she admits the reaching of the jejune state. However, it is not the purpose of this printing to condemn these hirsutal perversions of those who demand them; rather to appraise the risks involved in the manufacture and application of hair wavers and straighteners—but not overlooking the risks of the recipient, whether in the beauty shop or the home.

Disregarding the "curling-tongs-resting-on-the-kerosene-lamp-chimney" era of hair beautification, the early professional curling depended almost entirely upon the hot process. In this, heat, either from numerous electrical units or chemical cartridges in contact with wrapped wisps of hair, softened the hair shaft, with retention of the curled state on subsequent solidification. Near five years ago the cold wave process came into vogue. No apparatus is required beyond rollers so that both in homes and beauty shops this process is suitable and convenient. Some 25% of all permanent waving is done in the home, thus obviating professional services. The factor of safety justifies the purveying of lower strength waving materials, and thereby the necessity for more frequent waving. Some cold wave materials manufacturers point their product solely to home use. Such is the case with the brand name, "Crowning Glory," which identifies the product with which the major portion of the present study has been conducted. This product has as its active agent a buffered, stabilized, sodium thioglycolate. The majority (total near 40) rely upon ammonium thioglycolate. In the early days of the cold wave process, simple mineral sulphides were employed. These freely decomposed with the liberation of so much hydrogen sulphide as to constitute a practical threat to health and even to life, for those exposed. These sulphides were abandoned.

Industrial hygienic concern in cold waving obviously is limited to the professional operator in the

beauty shop. On a much lower scale, whatever is detrimental to the shop operator may appear in the household user. Manifestly, the level of exposure is markedly different. The housewife, more or less once in three months waves her hair, requiring some three or four hours of time. Contrariwise, the professional may render such services daily to some six or eight women. Moreover, the professional handles in addition to cold wave materials, a score or more of others requisite to the cosmetic trade. Undeniably, the beauty shop may be a fruitful source of dermatitis. The culpating arrow from period to period points to divers classes of substances as the cause. At this very time the thioglycolates are suspected as the sources of much dermatitis and in addition, some claims allege all manner of systemic disease, with liver and renal damage, paralysis, blood dyscrasias, and kindred affections. Such is the situation for industrial hygienic exploration.

Chemistry and Physics of Cold Waving of Hair

WHAT occurs when cold wave solutions appropriately are applied to growing hair is no simple happening in chemistry and physics. A less complex analogy may be found in the laboratory when a straight glass rod or tube is heated and bent into any desired shape. The end product involves no destruction, no alteration in the tube's bore or strength. Indeed, this glass object is much the same except for shape. The similar but more involved happenings in permanent waving through the cold solution process have been so well delineated in comment in the *Technology Review* (47:483, June, 1945) that the entire editorial is here quoted:*

Artificial Halo

"No sonnet now upon milady's eyebrow, but the subtleties of Science expended on the undulations of the damsel's tresses. The structure of organic molecules, their reactivity, the latest speculations on the inner texture of fibers, and substances synthesized from ethylene gas, by-product from the manufacture of gasoline by the cracking of petroleum—all these are applied in the ingenious 'cold wave' process whereby the hair is given a permanent crimp without recourse to heat. After the fact it is difficult to determine whether theoretical considerations produced the process or, the process having been worked out empirically, it was found to submit beautifully to scientific explanation. At any rate, the cold wave sends its roots into the profundities as deep as many a million-dollar triumph of modern chemistry.

"Hair is a protein fiber, a bundle of long protein molecules intertwined with one another and linked together crossways at intervals. In the cold wave process, the cross-links are broken, the fibrous bundle is bent to the shape which is to be permanently imparted, and cross-links are established again by new combinations of the parts of the original cross-linkages. As simple as that: The new linkages hold the bundle of molecules in the new shape.

"Proteins are condensed amino acids, long molecules formed by the linking together seriatim of amino acids, the acid end of one molecule being condensed with the amino end of the next, and so on, and so on. The amino acids are alike in the respect that they all contain an acid group and an amino group, but they are not all alike in certain other details of the arrangements of their atoms. One of them in particular, cystine, which constitutes about 15% of the protein of hair, is made up really of two amino acid molecules linked together crossways by a bridge or link of two sulphur atoms. Every cystine residue in a protein thus establishes one cross-link between two series of condensed amino acid molecules. Another cystine residue may cross-link the two series in another place or it may link each of the series independently to another one. The cross-links each grasp only two of the ultimate units of the fiber, but the links are so numerous and so well distributed that they give the bundle a certain pseudo-rigidity of its own, a resiliency, a shape to which it returns of itself when released from any stress which may have distorted it.

"Cystine is split by the action of appropriate reducing agents; the sulphur-sulphur linkage (–S–S–) which holds together the two halves of its molecule is opened up, hydrogen atoms are introduced forming –SH groups, and two molecules of cysteine are formed. The same thing happens to the cross-links of the hair fibre under the action of such materials as sodium sulphide, beta-hydroxyethylmercaptan, ammonium thioglycollate, and so forth. These are depilatories which soften the hair and, if allowed to act long enough, finally disintegrate it. Also, their offense is rank; they smell to high heaven. For cosmetic use they require to be camouflaged by perfumes which cover their disagreeable odors until art's hid causes are no longer found, and all is sweet, and all is sound—at least as far as the chemistry is concerned.

"Suitable oxidizing agents convert cysteine back to cystine; the hydrogen atoms are removed from the –SH groups, and the sulphur-sulphur linkage is restored. Hydrogen peroxide and sodium perborate are benign oxidizing agents which have been used to restore the cystine linkages in hair which has been softened by depilatories.

"The essential steps in the officinal cold wave process are about as follows. The hair is first washed thoroughly with a detergent solution containing an effective wetting agent either with or without a quantity of a depilatory material. This is to remove any oils or fatty substances which would tend to inhibit the softening process and, perhaps also, to produce a preliminary and partial softening. The hair to be waved is then wound on pegs where it is held in place by little clamps, and now it is treated, while under stress, with the agent which opens up the cystine linkages. The operator at this point sometimes tests the action of his solution on a selected sample of the hair in order to determine how long it is desirable to let the solution act. When the hair has been softened sufficiently, it is treated with the oxidizing material which establishes new cystine linkages at the places which have been brought into juxtaposition by the winding on the pegs. The hair is then unwound from the pegs, washed thoroughly, and thereafter treated as the taste of milady may dictate.

"By the cold wave process nothing is added, that is, nothing material, nothing except that immaterial and elusive something: She's gorgeous! She's enchanting! and so forth. Nothing is taken away, not even an atom. The original atoms have been coerced by chemistry into new arrangements giving the hair a new and enduring sinuosity."

The Materials and Procedures of Cold Waving of Hair

AT THE present time the chief materials utilized in cold waving are thioglycolic acid, $HS.CH_2.COOH$, which may have a small associated content of dithioglycolic acid, $(SCH_2.COOH)_2$, and thiodiglycolic acid $S(CH_2.COOH)_2$, all of which are modified to thioglycolates, the commonest of which being the ammonium thioglycolate ($HSCH_2CO_2NH_4$). No single formula will indicate the practices of all manufacturers of cold wave chemicals. The following formula is representative:

4% (by weight of final product) of thioglycolic acid (100%). Sufficient alkali (e.g., ammonium hydroxide) to neutralize. Approximately 2 ounces of essential oil of choice) for perfumery. Sufficient quantity of distilled water to produce 100 gallons.

A pH value between 8.8 and 9.2 appears to be optimal.

Some thioglycolates are available to the cosmetic manufacturer through pre-fabrication. These may only require dilution, de-odorization, and possibly increased alkalinization. Protection from the well-recog-

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nized toxicity of thioglycolic acid fully depends upon the integrity of the cosmetic manufacturer, either in his choice of basic material sources or in his own thioglycolate compounding. The original thioglycolic acid may be vended in various strengths (i.e, percentages); the ammonium hydroxide, if such be employed, in varying Beaumé or specific gravity values. Unless every batch of cold wave material is conditioned to these variations, opportunity for damage to both operator and consumer may arise. Mere adherence to fixed formulation is open to errors. Every batch should be standardized with an accurate pH meter and reliance should not be placed on test papers. An analogy may be found in the simple titration of hydrochloric acid with sodium hydroxide. If in an assumed chemical system, 25 ml. are required for complete hydrogen iron adjustment, it might be assumed that 24 ml. might nearly suffice. Quite to the contrary, 24 ml. might elevate the pH only somewhat above 2 units, while 25 might extend this unit value to 11. Unless the manufacturer of cosmetic thioglycolates precisely neutralizes the strong thioglycolic acid, he may be inviting disaster for his product, for the operators using his product, and for the consumer to whom the product is applied. It is not known that any product for cold waving directly resorts to thioglycolic acid, as such, and the belief is that all solutions based on thioglycolic acid have been alkalinized. No less, opportunity still may exist for the presence of some thioglycolic acid or kindred acid, on a decomposition basis, and otherwise conceivable over-alkinization may occur.

Subsequent to the application of thioglycolate to the hair, later to be mentioned, various neutralizers, fixatives, or setting agents may be employed. Perhaps no two manufacturers furnish identical materials. Therefore, again the formula shown is but an example:

	Neutralizing Solution:
0.5 oz.	Ortho-phosphoric acid 85%
3.5 oz.	Acetanilid USP powdered
640 oz.	Hydrogen peroxide 100 volume
q.s. 51 gallons	Distilled water

Acetic acid is sometimes substituted for phosphoric acid. When neutralizers are supplied in the unit package, the requirement is ordinarily for much higher dilution. Greater detail relative to analysis of cold wave solutions may be found in a publication by Dahle and Newburger, ("Methods of Analyzing Cold Wave Solutions," *The American Perfumer and Essential Oil Review*, February 1945, p. 35).

Procedures involved in cold waving are not uniform. The following presentation represents the steps more nearly common to all products intended for home use. Some manufacturers warn that bleached or dyed hair may react aberrantly. A few manufacturers recommend a single test curl to determine the appropriate duration for a given individual.

First, a thorough shampoo of the hair with complete removal of the soap but do not allow the hair to dry.

Arrange the hair so that it falls into numerous strands. Apply separately to individual strands of the still wet hair small quantities of the thioglycolate preparation. Then wind the strand around a curler ending in a tight curl wrapping.

When all strands are in place, more of the thioglycolate should be added to all curls consuming the entire contents.

After this, the entire hair area is wrapped by a towel and allowed to remain in place for the appropriate time, which ordinarily is from three to three-and-a-half hours. At the end of this time, with the curlers in place, the hair is well moistened with tap water.

Immediately afterwards the diluted neutralizing agent is dabbed on the curlers. After this step the curlers are removed and the hair again rinsed in tap water, then rinsed with the remainder of the solution.

Thereafter the arrangement of the hair may be made to conform to the wishes of the user. If any thioglycolate or neutralizer should remain, this should be discarded.

Physical and Chemical Properties of Thioglycolic Acid and Thioglycolates

THIOGLYCOLIC acid never appears as such in cosmetics, or at least should not appear. The industrial hygienic problems of thioglycolic acid essentially are limited to the manufacture of thioglycolic acid and thioglycolates. The physical and chemical properties of thioglycolates are illy established, reference customarily being made to the parent substance. This custom is here followed.

Thioglycolic acid (spelled either with one or two final ls), $HS.CH_2COOH$, mercaptoacetic acid, produced (one way) by heating chloracetic acid with potassium Hydrogen sulphide; molecular weight 92.09; sulphur 34.81%; a colorles liquid; strong, unpleasant skunk odor; specific gravity 1.325. Melts —16°C., boils 104-106°C. (15 mm). Dissociation constant, $Ka^{25°}$. 2.85×10^{-4}

On heating, thioglycolic acid yields thioglycolide, SCH_2CO.

For identification, see Jones, *J. Assoc. Official Agricultural Chemists*, 27:574 (1944). Chief thioglycolates: NH_3, Ca, K, Na, Bi, Sb. Mulvaney (*Proc. Scien. Sec. Toilet Goods Assoc.*, May 17, 1946) has reported more extensively on the physical and chemical properties of thioglycolic acid with particular reference to decomposition; the ill influence of the presence of any iron, manganese, or copper; the ease with which dithioglycolic acid may appear in commercial waving solutions. This author is now quoted:

"The solutions of thioglycolic acid—more specifically, the dilute solutions of ammonium thioglycolate of pH above 9, which until recently have been used for cold permanent waving—have been consistently reported to be unstable. Because of this poor stability, the shelf life of these waving lotions was very short and the resulting waves, if any, were completely unpredictable. To complicate matters further, no two batches of thio-acid from the same manufacturer behaved in the same way. Extensive research, however, has shown that a pure acid of uniform quality may be produced on a commercial scale at approximately one-third the market price of several years ago. The contaminants responsible for the instability of the acid have been recognized and means to eliminate them have been devised."

The Hydrogen Sulphide Situation

IT IS KNOWN that thioglycolic acid tends to decompose with the formation of hydrogen sulphide as one product. If all of the sulphur in the thioglycolic acid molecule were to be transformed into hydrogen sulphide, which is unlikely, 1 ml of 100% thioglycolic acid might provide 344 parts of hydrogen sulphide in the air of 25 cubic feet. At an earlier time (*J.A.M.A.*, 131:776, June 29, 1946) question was raised as to the possibility of evolvement of sufficient hydrogen sulphide, under the usual circumstances of permanent waving, to account for the systemic disease allegedly deriving from such exposure on rare occasion. Answer to that query possibly may reside in this section.

The toxicity of hydrogen sulphide is such that the standard for prolonged exposure devised by the American Standards Association is 20 ppm for standard conditions. If it may be assumed that every adult

breathes approximately 1 meter of air per hour, it follows that at this tolerated level of 20 ppm of air, 27.8 mg. of hydrogen sulphide entering the body still falls within the safe limit. If the permanent waving process does not extend beyond 4 hours, which appears ample, 111.2 mg. of hydrogen sulphide might be tolerated. Therefore, the question involved is whether under any ordinary circumstances of permanent waving, those exposed might have imposed on them hydrogen sulphide in excess of 111.2 mg. for customers or 222.4 mgs. for the operator working an 8 hour day.

Commercial thioglycolic acid (about 84%), standing in half-filled bottles, may give rise to some 200 ppm of hydrogen sulphide within the bottle. Should this be removed, as much as 10 ppm may reappear in 10 minutes, in the superimposed air, all tests being made with the silver cyanide method employing hypersensitive tubes.

In the case of thioglycolates in the form of commercial hair waving preparations, similar tests for hydrogen sulphide indicate concentration from 2 to 20 ppm in the air above the liquid levels in containers. It follows as possible that large evaporating surfaces, such as provided by the hair of the head, or heat, or air oxidation, or chemicals of the hair, might so act as to accelerate this decomposition to dangerous levels of hydrogen sulphide.

Into a five gallon glass bottle was introduced glass wool in quantities approximating that of a woman's hair. Upon this was sprayed thioglycolic acid and thioglycolate in quantities comparable to those used in permanent waving. At times this arrangement was brought to higher than body temperatures, was subjected to the action of oxygen; clipped rabbit hair was substituted for glass wool. Under all such conditions tests for hydrogen sulphide were made and at no time did the level reach 5 ppm.

A chemical system was provided consisting of suction pressure, a flask for holding a content of thioglycolic acid and thioglycolates, including several commercial waving preparations, which flask in turn was connected with a condenser, and then a train of flasks containing appropriate quantities of cadmium chloride. The content of thioglycolic acid or thioglycolate was subjected to various modifications such as oxidation, heating, boiling, acidulation, was admixed with hair, etc. The suction system led to the bubbling of all liberated sulphur compounds through the cadmium chloride train, and later appropriate determinations were conducted. Always the objective was to measure any unusual release of hydrogen sulphide potentially detrimental to those exposed.

METHODS: MCHATTIE and MacNiven, (*Canadian Chem. and Proc. Ind.*, 30: 87, July 1946) have devised procedures for the partitioning of various forms of sulphur likely to be encountered on chemical analysis.

These are sulphur oxide, mercaptans, thiophene, and carbon disulphide. In the present instance, concern was limited to mercaptans and hydrogen sulphide, the two being associated. The authors mentioned, in describing selective absorbants, stated with reference to mercaptans:

"Mercaptans are absorbed by the cadmium chloride reagent recommended by Shaw. The reagent is prepared as required by adding 10 ml. of 1 N sodium carbonate to 60 ml. of a 10 per cent solution of cadmium chloride. Hydrogen sulphide is also absorbed while thiophene, carbon disulphide, and carbon oxysulphide are not affected."

Later, after describing the apparatus employed, these authors indicate the method of mercaptan determination and calculation in the following language:

"Ten ml. of concentrated hydrochloric acid are added through the joint and the absorber is shaken gently until the solution is free of precipitate. Ten ml. of 0.01 N iodine solution, measured accurately by an automatic pipette, are next added and the absorber shaken for a minute. Excess iodine is then titrated with accurately standardized 0.01 N sodium thiosulphate solution. A similar procedure is carried through on a blank solution and the difference between the two titrations with thiosulphate measures the equivalents of iodine consumed in the reaction with sulphides and mercaptides. Mercaptan sulphur is calculated on the basis that one atomic weight of iodine is equivalent to one atomic weight of sulphur combined as mercaptans.

Hydrogen sulphide interfers since it is also absorbed and each atom of sulphur present as hydrogen sulphide is equivalent in the reaction with iodine to two atoms of mercaptan sulphur. For low mercaptan concentrations, as calculated above, the interference is not significant since the chief importance of the determination is to establish the fact that the combined concentration of hydrogen sulphide and mercaptan is negligible. If it becomes necessary to differentiate between hydrogen sulphide and mercaptans the differential titration method of Shaw is available."

AS THE matter now stands, the mercaptan sulphur and hydrogen sulphide have not been differentiated. To accomplish this Shaw has evolved a method relying upon Shaw sulphide flasks and utilizing the following procedures:

"Procedure B (determination of hydrogen sulfide alone). The sample is taken and the flask evacuated, as previously mentioned; chilling is omitted. At this point the solution in the sulfide flask is made just acid to methyl orange with 1 N hydrochloric acid, added through the groove in the stopper in the funnel top. (The methyl orange is put in the acid to be added.) Then 8.3 ml. of 1 N hydrochloric acid are measured out and, together with an amount of water sufficient to dilute the sample to approximately 100 ml., are introduced into the flask in the same manner. The volume of solution is adjusted with water to 100 ml. and the flask is well shaken. The stopper is removed, a pinch of dry asbestos wool added, the stopper replaced, and the flask shaken again to facilitate filtration. At this acid concentration (3 grams of free hydrochloric acid per liter) the cadmium mercaptides are in solution and the cadmium sulfide is in suspension. A similar separation under different conditions has been employed in the analysis of petroleum oils.

"The solution is then filtered through asbestos on a Gooch crucible (the bitumen size crucible is preferred) with moderate suction. The stopper is placed in the mouth of the flask, about 10 ml. of dilute hydrochloric acid (80 ml. of N hydrochloric acid per liter) are poured in the funnel top, the stopper is raised vertically, and the solution is allowed to flow into the flask. The flask is then shaken and the acid poured into the Gooch crucible. The open flask is next blown out to remove mercaptan vapors. The suction is kept on the Gooch filter only long enough to free the pad of loose water, whereupon it is immediately removed. The asbestos pad is rolled up with a stirring rod and transferred to the sulphide flask. A pinch of dry asbestos is placed in the crucible, made just moist, and used to wipe out adhering cadmium sulfide; it is then transferred to the flask, the stopper is inserted, and the flask is evacuated. Ten milliliters of concentrated hydrochloric acid are added, followed by enough water to dilute to about 50 ml., and the whole is shaken to disintegrate the cadmium sulfide precipitate. A measured amount of standard iodine is added in slight excess and the excess iodine is titrated with thiosulfate.

Calculations, Procedure B.

$$\frac{\text{(Net ml. of 0.1 iodine) } 0.0017 \times 15.43 \times 100}{\text{Cu. ft. of gas in sample (corrected)}} = \text{grains of } H_2S \text{ per 100 cu. ft. of gas}$$

Then
(Net ml. of 0.1 N I_2, Procedure A)—
Cu. ft. of gas in sample (corrected)
(Net ml. of 0.1 N I_2, Procedure B)
Cu. ft. of gas in sample (corrected)
$\times$ 0.0032 $\times$ 15.43 $\times$ 100 =
grains of mercaptan sulphur per 100 cu. ft. of gas"

In our own work the total sulphur as represented by mercaptans and hydrogen sulphide was so low as to make further separation valueless.

Based on the principles just described the results shown in Table I were obtained:

TABLE I.

SOLUTION	AMOUNT	TIME	TOTAL H_2S AND MERCAPTIDES
Thioglycolic acid (84%)..... Room Temperature Without hair	100 cc.	1 hr.	2.37 mg.
Thioglycolic acid (84%)..... Room Temperature With hair	100 cc.	2 hr.	10.8 mg.
Thioglycolic acid (84%)..... Boiling	50 cc.	½ hr.	1.6 mg. (comes over as mercaptan sulphur)
Thioglycolic acid (84%)..... Room Temperature Without hair	1 cc.	1 hr.	.0004 mg.
Thioglycolic acid (84%)..... Room Temperature With hair	1 cc.	1 hr.	.0012 mg.
Crowning Glory (Stabilized)..... Room Temperature Without hair	45 cc.	1 hr.	.0023 mg.
Crowning Glory (Stabilized)..... Room Temperature With hair	45 cc.	1 hr.	.0018 mg.
Crowning Glory (Unstabilized)..... Without hair	45 cc.	1 hr.	.0007 mg.
Crowning Glory (Unstabilized)..... With hair	45 cc.	1 hr.	.0006 mg.
Crowning Glory (Stabilized)..... +25 cc. Mineral Acid	45 cc.	1 hr.	.003 mg.
Thioglycolic acid (84%)..... +25 cc. Mineral Acid	50 cc.	1 hr.	1.87 mg.
Crowning Glory..... +Neutralizer With hair	45 cc.	1 hr.	.005 mg.
Crowning Glory..... +Neutralizer Without hair	45 cc.	1 hr.	.006 mg.
Commercial Product "W"..... Room Temperature Without hair	30 cc.	1 hr.	.0013 mg.
Commercial Product "W"..... Room Temperature With hair	30 cc.	1 hr.	.0012 mg.
Commercial Product "X"..... Room Temperature Without hair	25 cc.	1 hr.	.0014 mg.
Commercial Product "X"..... Room Temperature With hair	25 cc.	1 hr.	.0013 mg.
Commercial Product "Y"..... Room Temperature Without hair	30 cc.	1 hr.	.0017 mg.
Commercial Product "Y"..... Room Temperature With hair	30 cc.	1 hr.	.00071 mg.
Commercial Product "Z"..... Room Temperature Without hair	25 cc.	1 hr.	.0012 mg.
Commercial Product "Z"..... Room Temperature With hair	25 cc.	1 hr.	.0021 mg.

The commercial preparations casually tested were not selected. All that were available at one drug store were purchased. While all except Crowning Glory are believed to represent ammonium thioglycolate, this appraisal depends solely on the odor of ammonium.

The derivation of more sulphur from stabilized preparations than from the same material unstabilized might appear to be anomalous. Actually these higher findings indicate the retention of sulphur that in the unstabilized form already would have been dissipated through decomposition.

No significance whatever is attached to minute deviations, such as .007 and .005 mg. Such errors and more are well within the limits of the accuracy of the method.

All of the commercial preparations casually tested by the method under discussion were also tested with the silver cyanide apparatus. From none was derived more than traces of hydrogen sulphide.

Contact between hair and thioglycolic acid (not thioglycolates) greatly increases the quantity of liberated combined mercaptides and hydrogen sulphide.

From all the foregoing, justification appears to exist for the contention that no manipulation of cold wave materials likely to occur either in the beauty shop or at home would give rise to sufficient quantities of hydrogen sulphide to warrant apprehension as to systemic disease.

The Stabilization of Thioglycolic Acid and Thioglycolates Against Hydrogen Sulphide Formation

THE early unfavorable experience from mineral sulphides as a source of hydrogen sulphide has engendered a continuing state of apprehension with regard to all sulphur bearing keratin modifiers. Although hydrogen sulphide in quantities sufficient to induce systemic disease has never been detected in any commercial cold wave solution of the thioglycolate type (such as tested), the presence of any measurable amount has been accorded disfavor. The work of Mulvaney indicates the production of thioglycolic acid in superior state but some hydrogen sulphide still appears in some products. One thioglycolic acid manufacturer admitted inability to eliminate all hydrogen sulphide through customary methods of stabilization. The validity of this attitude was questioned and search was made for a practical stabilizing agent effective against hydrogen sulphide liberation. Several scores of potential stabilizers were investigated with unsatisfactory results from the majority. Several proved chemically acceptable, but unfortunately were themselves toxic, which fact precluded use. Various organic lead compounds serve well as inhibitors but obviously have no place in cosmetics. It is possible that the best stabilizers for this purpose may be found in certain amino acids known to the intestinal tract. The product chiefly investigated is stabilized to the point that no (or merest traces of) hydrogen sulphide has proved detectable. This protective action has persisted over an approximate 12 months period.

Patch Tests with Thioglycolic Acid and Thioglycolates

IN ANY investigation dealing with the physiologic actions of cosmetics, obviously the prime consideration has to do with serious systemic action after entry by inhalation or skin absorption. A second, but still essential consideration involves primary skin irritation, sensitization, and eye irritation. Primarily this section is devoted to results from patch and scratch tests, chiefly on humans, but including minor inquiry dealing with animals through means of patch and scratch tests, together with casual observation during and after exposure to vapors.

The patch tests were carried out through well-nigh standardized procedures with duration ranging from 1 hour through 96, with application diversly to forearm, back and thigh, with blonds, brunettes and Negroes participating, with representation from ages 21 to 60, with a preponderance of females.

PRELIMINARY EXAMINATIONS: In the year 1942, it was hoped that thioglycolic acid itself, in concentrations sufficient for hair waving, might prove to exert no harm on the skin of humans or animals. Accordingly, with it we carried out 294 skin tests on humans and 68 on rabbits. In addition 63 human skin tests involved needle scratching or sand papering. Likewise,

some of the animal skin work involved abrading and needle scratching. Embraced within this period was work dealing with thioglycolic acid in concentrations up to 11%. Some of the preparations utilized contained divers wetting and other auxiliary agents. A limited number of experiments led to the application of thioglycolic acid in varying concentrations to the conjunctivae and corneas of rabbits. Similarly, in a few animal experiments thioglycolic acid, as such, and with adjuvants, was introduced as a mixture into a gassing chamber containing rabbits.

From this preliminary work it was established that thioglycolic acid is a primary skin irritant in relatively low concentrations (circa 2.8%); that it is more damaging to the broken skin; that conjunctivae and corneas may be damaged by direct contact; that rabbits are less responsive than humans. Thioglycolic acid, as such, was deemed to be unsuited to the intended use, and a shift to thioglycolates was instituted.

PATCH TESTS WITH BUFFERED SODIUM THIOGLYCOLATE (STABILIZED AND UNSTABILIZED) AND THIOGLYCOLIC ACID: In four locations (hospitals and one college) 1129 patch tests were carried out, utilizing chiefly aqueous, buffered sodium thioglycolate, stabilized or unstabilized, but in addition higher percentages of thioglycolate in cream form (two percentages) and finally thioglycolic acid in 4.6% strength, which strength is higher than that leading to the buffered sodium thioglycolate as commercially applied. In these tests the lowest content of the thioglycolate was that derived from an original concentration of thioglycolic acid 3.52% (by weight of final product). The total number of tests, 1129, embraces 162 later referred to in a section devoted to sensitization. The contact period ranged from 4 to 97 hours (one, 9 days).

Little gain would arise from detailed tabulation of results by concentration and results by hours of exposure. Instead the entire lot of findings are reduced to a series of summarizing statements.

1. No single patch test with buffered sodium thioglycolate (based on 3.52% thioglycolic acid), stabilized or unstabilized, proved positive as a result of contact periods from 4 to 96 hours.

2. No single patch test with buffered sodium thioglycolate (based on 4.6% thioglycolic acid) proved positive under 24 hours, but for longer exposures occasional positivity may arise.

3. Patch tests with the hydrochloric acid type of neutralizer (diluted as for use) gave rise to no positive responses.

4. Patch tests carried out with buffered sodium thioglycolate, after aging for an excess of 12 months, was slightly more irritating, as shown through patch tests of long contact period, than other solutions of recent manufacture, but the formulation, while similar, was not identical.

5. Based on animal experimentation, it is believed that thioglycolate solutions constitute definite irritants for conjunctivae and corneas.

6. Thioglycolic acids, as such, in 4.6% (aqueous solution) induced positive responses from the 4 and 6 hour contact periods.

7. Thioglycolates in cream form up to 7.13% induced no positive reaction from 4, 6, and 9 hour contact periods, but results from longer periods are shown in Table II.

8. In another series of patch tests with the same material as (7) above and an additional one slightly modified, 197 patch tests were performed in identical manner. From this group 10 positives derived but none at or below the 24 hour level. For each of the two substances five positive reactions appeared but only after 48 or 72 hours of contact.

TABLE II.
RESULTS FROM PATCH TESTS 7.3% SODIUM THIOGLYCOLATE (CREAM FORM), PROLONGED EXPOSURE

NUMBER	CONTACT TIME (hrs.)	No. POSITIVE	%
182	24	16	8
51	48	7	13.7
14	72	2	14.3
12	96	7	58.3

9. Forty-four patch tests of 24 hours duration utilized four commercial cold wave solutions purchased at random and believed to represent ammonium thioglycolate. Within this number three were positive, two for one product and one for another.

The Prospects of Sensitization

APPARENTLY individuals may become sensitized to almost any substance. Some substances possess high allergenic properties while others are correspondingly low, and a few are devoid of proved capacity to establish the state of allergic sensitivity. In many instances, including the present one, the desideratum is to establish the level of allergenic capacity. Accordingly, repeat patch tests have been carried out on 162 persons at varying elapsed times after the initial test. The foremost period was from 7 to 10 days after the initial test. This method of appraisal of allergenic activity was discussed in this Journal (INDUSTRIAL MEDICINE, 14:7, 595, July, 1945) in a publication by Grolnick. In the present work a few persons have been tested at intervals over a period of three years to a total of 25 tests for a number. As a feature of this exploration, some retests have been applied at the same site as the original, others at remote sites. This presentation does not invade the controversy as to local sensitivity versus total body sensitization. While the primary tests sometimes were kept in place for a duration up to 97 hours, all retests were limited to 24 or 48 hours, since allergic responses customarily appear within that duration.

Of 162 retests, no one led to a positive response in the absence of a like initial response. The percentage of positives from re-tests is slightly lower than that for the original series. This is interpreted to mean that at their worst thioglycolic acid and thioglycolates (such as tested) are low in allergenic capacity. It may be conceded that the possibility exists, and further that through cross or group sensitization, reactions might occur related to all manner of sulphur compounds. No such cases have been observed.

Systemic Effects on Animals of Thioglycolic Acid and Thioglycolates

FOR the purposes of determining organic damage of thioglycolic acid and certain thioglycolates, subcutaneous implantations were made in rabbits and rats representing various amounts and modifications of thioglycolic acids and thioglycolates. In due course blood examinations were performed, urine analyses, observation of the animals over a period of weeks, followed by sacrifice of the animals, and gross and microscopic organ appraisal. The volume of results necessitates a subsequent publication. The intent here is only to indicate the trend of findings from work not yet complete, which eventually will embrace intravenous and inhalational introduction. Four ml. per kilo of body weight of 10% (volume) of thioglycolic acid irregularly leads to the death of animals about 16 hours subsequent to the injection. This was true

of deep muscle injections as well as for subcutaneous ones. When one ml. of respectively 5 and 2.5% thioglycolic acid (84%) was injected daily for longer periods, such as 20 days, marked ulceration appeared at the point of injection. These sloughs did not appear from the injection of thioglycolates. From incomplete returns from pathologic examinations, it does not appear that any examined organs exhibit evidences of severe damage.

It is here noted that Brunschwig, Johnson and Nichols (*Proc. Soc. Exptl. Biol. Med.*, 60:388, 1945) demonstrated that in rats marked protection against hepatic injury of carbon tetrachloride was furnished by the concurrent introduction of sodium thioglycolate.

Effect of Alkaline Mercaptans on Tensile Strength and Elasticity of Hair and Surface Action on the Hair Shaft

SOMEWHAT apart from toxicology, but still within the province of physiologic action are the items just captioned. In the absence of direct examination of such properties the manufacturer of the investigated product has furnished the results of extensive inquiry here epitomized. An apparatus was provided which determined the weight required to break a single hair, and the amount of stretch occurring prior to the hair rupture. This apparatus was utilized in connection with hair before cold waving, hair immediately after cold waving, and hair at a later period, such as after 30 days. For every subject several hairs were tested, but all results were reported as averages. It was established that all solutions representing both thioglycolates and monoethanolamine thioglycerol tended mildly to decrease tensile strength and to increase elasticity. In some instances the effect on the elasticity was more pronounced at the end of 30 days than immediately after application. However, the total results are such as not to create any state precluding further use or indicating hair damage.

This same manufacturer directed an inquiry as to the action of various permanent wave materials on the structure of the hair during the contact period and some hours after the time of the first application, that is, after the complete removal of the active substance. Four classes of substances were investigated: (a) thioglycolates, (b) substances like monoethanolamine thioglycerol, (c) 10% ammonium carbonate, (d) the heat type of home permanent wave solution. It was concluded that the thioglycolate type of cold wave solution exerts no final effect upon the hair structure, although during the contact period definite alteration of the cell structure of the cuticle occurs. From the monoethanolamine thioglycerol type it was noted that in the final results the hair surfaces are rough, the cuticle cells remain swollen and the surface platelets are somewhat elevated. Class (c) evidenced prompt swelling and the platelets lifting after 60°C heating. The machine-type of permanent waving substances are credited with a final result in which the hair surface is rough and the cuticle cells appreciably swollen and to an extent greater than in the case of the cold wave solution. While none of these reactions are sufficient to justify condemnation of all permanent waving, they do serve as an indication that all permanent waving involves deviation from the normal hair state.

Protection for the Beauty Shop Operator

FOR THE purpose of safeguarding the persons most exposed to thioglycolates along with divers substances possibly more harmful, a number of recommendations are now introduced:

1. The product or products selected for use should be limited to those well established as standardized and not subject to possible mishaps of haphazard formulation.
2. All operators should wear surgical gloves in connection with the application of various beauty shop chemicals, including thioglycolates, neutralizers, fixatives, etc.
3. Since some cold wave preparations retain offensive mercaptan odors to the point of discomfort but not damage to health, it may be necessary that exhausts be installed for air dilution.
4. Beauty shop operators with skin diseases on exposed areas particularly should avoid contact with various substances common to beauty shops, and including thioglycolates, neutralizers, fixatives, etc.
5. In the presence of skin diseases with characteristics suggesting contact dermatitis or sensitization, patch tests should be carried out by a physician in order to determine the exact agent responsible. This is a general statement and without specific reference to cold wave preparations. After the establishment of the precise cause of such affection avoidance of direct contact with that substance may be sufficient to escape perpetuation of the skin condition, but on rare occasion proximity of the offending substance from use by others may prove to be injurious.
6. While it is likely that thioglycolic acid, as such, will not be introduced into beauty shops, it should be recognized that this agent is distinctly harmful, with prospective damage increasing with the percentage of the thioglycolic acid.
7. Since the work of beauty shop operators necessitates almost endless washing of hands and arms, and equally frequent contact with water in connection with customer needs, all operators should make use of frequent applications of water-impervious creams, although this may not be necessary if surgical gloves are worn.

Summary

THE physiologic properties of thioglycolic acid and thioglycolates have been investigated, foremostly in relation to cosmetic use. This report is concerned with the chemistry and physics of hair waving, primary skin irritation, the prospects of sensitization, the extent of instability of thioglycolic acid and thioglycolates, stabilization, systemic action after subcutaneous introduction, and direct action on the hair.

The conclusions reached are:

Thioglycolic acid in relatively low concentrations is toxic and may induce necrosis from subcutaneous implantation.

Sodium thioglycolate when free from thioglycolic acid, in concentration approximating 4% in contact with the skin for 4, 6, 9, 24, 48, 72, and 96 hours has not produced demonstrable damage.

Ammonium thioglycolate, commercial preparations of unknown concentration, but designed for identical application, induced skin injury (7.4% frequency) at the 24 hour contact period but not for 4, 6 or 9 hour periods.

Sodium thioglycolate in concentrations approximating 7% provoked skin irritation at and above the 24 hour contact period.

These conclusions derive from 1129 patch tests applied to humans.

The allergenic properties of both thioglycolic acid and thioglycolates as measured by repeated patch tests were appraised as low or non-existent.

The total quantity of hydrogen sulphide arising after

induced decomposition of either thioglycolic acid or thioglycolates is insufficient to produce systemic poisoning.

Stabilization of thioglycolic acid and thioglycolates to prevent the appearance of hydrogen sulphide (or not more than mere trace) is practical.

Thioglycolates exert some action on hair tensile strength, elasticity, and cellular state, but the degree of such does not preclude use.

Continuing exposure for professional beauty shop operators, to thioglycolates and other cosmetic chemicals requires a program of protection, unnecessary in occasional household use.

Study of Absenteeism During a Five-Month Period

—Following Influenza "A" and "B" Vaccination—

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THE GREATEST single cause of absenteeism in industry is disease of the respiratory tract. Consequently, one of the major goals of the industrial physician is to seek ways and means of decreasing this tremendous loss to both employee and employer.

The latest path of promise appears to be in mass vaccination with Influenza "A" and "B" vaccine. Francis, Salk and Brace[1] reported that subcutaneous vaccination with inactivated influenza virus types "A" and "B" exerted a striking protective effect against epidemic influenza "B." In 600 vaccinated men in the Army, the incidence of influenza was 1.15%. In 1,100 unvaccinated men, the incidence was 9.91%.

A mild influenza epidemic which swept New York state in December, 1945, was associated with the type "B" influenza virus. The epidemic reached its peak in January, 1946, and was definitely on the decline in February. It was decided that the use of the new influenza ("A" and "B") vaccine might be of value in reducing incidence among employees, and an attempt was made to obtain the vaccine. A sufficient amount was not available, however, until January, 1946, at which time the following study was initiated.

Method of Study

VACCINATION with influenza "A" and "B" vaccine was offered to office employees in New York City during January, 1946. Six hundred and sixty-five requested the injections and they were given a series of two injections of ½ cc. each one week apart during January. The following five months (February through June, 1946, inclusive) were taken as the study period for absences and after that time the data concerning absences and cause for same was collected and analyzed. The records of a control group of 656 employees who did not take the vaccine were also analyzed. The control group was picked from employees of the same departments who in most cases worked side by side with the employees who were vaccinated.

Results of Study

THE ANALYSIS of the data relating to absences is presented in Table I. Fifty-five percent of the vaccinated group had absences during the five-month study period with a total time loss of 1,515 days. In the non-vaccinated group, 45% of the employees had absences which totaled 1,405 days lost.

Breaking down the lost time into absenteeism due to diseases of the entire respiratory tract further revealed that 38.3% of the vaccinated group had absences that resulted in 761 days lost while 28.9% of the non-vaccinated group had absences that totaled 607 days.

An analysis of the common respiratory diseases generally considered to be viral in origin (common cold, grippe, influenza) showed that 34.1% of the vaccinated group had absences totaling 673 days, while in the control group 24.2% had absences totaling 456 days.

The absenteeism due to sinusitis and pneumonia was so low in both groups that a comparison of any value cannot be made.

A questionnaire was given at the end of the study period to each person who received the vaccine. The

TABLE I. INFLUENZA VACCINE ("A" AND "B") SURVEY ABSENTEEISM IN PERIOD OF 2/1/46 THROUGH 6/30/46

	STUDY GROUP Received Vaccine		CONTROL GROUP No Vaccine	
	Number	Per-centage	Number	Per-centage
Total Number Employees per Group	665		656	
Absenteeism—General (all causes)				
Employees Absent	355	55.0%	296	45.1%
Total Absences	680		538	
Absences per Absentee	1.91		1.81	
Total Days Absent per Absentee	4.26 da.		4.75 da.	
Total Days Absence in Group	1515		1405	
Average Absence per Employee	2.27 da.		2.14 da.	
Absenteeism due to all types of Respiratory Disease (sinusitis, colds, pharyngitis, tonsillitis, influenza, grippe, pneumonia				
Employees Absent	255	38.3%	190	28.9%
Total Number of Absences	410		284	
Total Days Absent	761		607	
Average Days Absent per Absentee	2.98 da.		3.19 da.	
Average Days Absent per Case	1.85 da.		2.13 da.	
Average Absence per Employee	1.14 da.		0.91 da.	
Absenteeism due to colds, grippe, influenza				
Employees Absent	227	34.1%	157	24.2%
Total Number of Absenc	371		244	
Total Days Absent	673		456	
Average Days Absent per Absentee	2.96 da.		2.90 da.	
Average Days Absent per Case	1.81 da.		1.86 da.	
Average Absence per Employee	1.01 da.		0.69 da.	
Absenteeism due to Sinusitis				
Employees Absent	9		4	
Total Number of Absences	12		6	
Total Days Absent	13		11	
Average Days Absent per Absentee	1.44 da.		2.75 da.	
Average Days Absent per Case	1.08 da.		1.83 da.	
Absenteeism due to Pneumonia				
Employees Absent	1		2	
Total Days Absent	20		81	

TABLE II. INFLUENZA QUESTIONNAIRE ANALYSIS

1. How did the respiratory infections present between February and the end of June, 1946, compare in severity with those experienced during previous years?

	Number	Per Cent
More Severe	29	11.8%
Less Severe	130	53.0%
Same Severity	86	35.2%

2. What vaccine reactions occurred?

	Number	Per Cent
No reaction	177	41.7%
Painful Arm	209	49.2%
Fever	34	8.0%
Headache	31	7.3%
Backache	10	2.3%
Dizziness	2	0.47%
Gastric Upset	2	0.47%
Abdominal Cramps	1	0.23%
Generalized body aches and malaise	1	0.23%

3. Do you believe the vaccine was of value to you during the period between February and the end of June, 1946?

	Number	Per Cent
Yes	337	78.5%
Questionable	56	13.0%
No	36	8.5%

tabulation of their replies is given in Table II. The majority (53%) of those answering stated that the severity of the respiratory infections after vaccination was less than during previous years, and 78.5% were of the belief that the vaccine was of definite value to them during the study period.

Reactions to the vaccine were mainly local, as manifest by a painful arm (49.2%) with a small number of general reactions; fever (8%) and headache (7.3%). No serious reactions were encountered.

Discussion

EVALUATION of absenteeism in the conditions of this study is of necessity only a crude index of the value of influenza vaccination in conditions other than epidemic "flu." The diagnosis of the condition responsible for the absence was made either by the employee's personal physician or by the employee himself. The employees who elected to take the vaccine probably in many instances were prompted to do so by a previous experience of frequent colds during the winter season, while those who did not take the vaccine were probably individuals who generally had less frequent respiratory infections. Thus, the vaccinated group was unduly weighted by individuals who might be considered to have a low natural resistance to respiratory infections. The control group may be considered to be largely composed of people who normally had a relatively higher respiratory disease resistance, or else they had maintained a better health status in previous winters. It is probable that a selected group for a study of this type, rather than volunteers, would allow a more satisfactory conclusion to be drawn.

An influenza epidemic did not occur during the study months, so that the results cannot be interpreted in terms of protection against epidemic influenza However, the study is of interest in evaluating whether the routine administration of influenza vaccine ("A" and "B") has an effect on absence during the period of the year when absences due to respiratory infections are high.

Of the employees studied, the group that was vaccinated with influenza vaccine ("A" and "B") had a greater absence rate (1.14 days per employee) from all respiratory tract diseases than the control group (0.91 days per employee) during a five-month period of study. When only colds, grippe and non-epidemic influenza were considered, the vaccinated group lost 673 days (1.01 days per employee) from work during a five-month period, while the control group lost 456 days (0.69 days per employee) in the same period. However, paradoxically, over half of the vaccinated group were of the opinion that their respiratory infections were less severe than in previous years and over three quarters of the group believed that the vaccine had been of value to them and wanted to receive it again. Indeed, the power of suggestion must be strong, as the voiced value was not reflected in the absentee rate.

Summary an Conclusions

MASS VACCINATION of 665 volunteers (employees) with influenza vaccine ("A" and "B") was performed and absenteeism for the following five months was recorded. A control group of 656 employees (those not volunteering) working in the same environment was also analyzed for absences.

The vaccinated group lost 673 days from work (1.01 days per employee), while the control group lost 456 days (0.69 days per employee) during a period of five months from colds, grippe, and influenza (non-epidemic). Since the volunteer group was probably prompted to take the vaccine on account of frequent respiratory infections in the past, it is questionable whether their absence might have even been greater had they not received the vaccine.

Epidemic influenza did not occur during the period of the study, so the results are of no value in terms of protection against epidemic influenza.

A more complete controlled study is indicated in which employees are selected by the physician without regard to past history of respiratory infections. Large groups should be used, so that the results will be statistically significant. One group should be given the influenza vaccine, another group should receive placebo injections and the third group given nothing, so their absenteeism can be used as a base line control.

This study shows that, in our experience to date, indiscriminate influenza vaccination of employee volunteers is of no apparent value in reducing absenteeism due to common respiratory infections. However, based upon favorable reports in the literature, we recommend that industrial physicians keep in close touch with public health authorities in regard to the status of epidemic influenza. When it appears that the incidence of influenza is approaching epidemic proportions, then mass vaccination with influenza vaccine should be instituted so that maximum immunity will be attained before the full impact of the epidemic occurs.

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The Reconstruction of the Amputation Stump

—For Weight Bearing—

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THE SURGICAL attitude toward amputations did not progress significantly during the time between the two World Wars. Surgeons who served in the First World War describe to us the complicated procedure necessary to secure permission to do an amputation and the resistance with which that treatment was met. An amputation was never a treatment of choice and was resorted to only as a final and desperate measure in order to save a life. The usefulness of the limb as well as the physical and financial comfort of the patient was sacrificed to the dubious goal of saving a limb. In contrast to this attitude, Army and Navy surgeons in World War II recognized the value of early amputations and to a certain extent helped to remove the social stigma from the amputee. For them, amputation became the accepted treatment whenever the following conditions existed: (1) irreparable damage to the blood supply; (2) uncontrollable infection; or (3) extensive mutilation and tissue destruction making restoration of function impossible. They preferred well managed amputations that allowed the patients to walk normally within a few months, to the retention of a badly injured leg that could only result in a stiff, painful, heavily scarred and non-weight-bearing member. In the United States Army and Navy Hospitals valuable data concerning the whole problem of amputations were gathered and passed along to field surgeons whose work included traumatic limb injuries.

In civilian practice the industrial surgeon, more than any other surgeon, is confronted with the prob-

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lem of handling badly damaged extremities and his responsibility to the amputee is a heavy one. He can profit by the collected literature on amputations that is now available to him. The Canadian, English and American amputation centers have published their war findings in recent journals. I call your attention in particular to two publications of the Naval Medical Bulletin: (1) *Symposium on Amputations*, Naval Amputation Center, U. S. Naval Hospital, Mare Island, California of June 5, 1945, and (2) *Rehabilitation at the U. S. Naval Hospital Philadelphia*, supplement to U. S. Naval Medical Bulletin, March, 1946. Both of these reports contain full information on the work of amputations done at two Navy Amputation Centers and devote special chapters to each phase of the amputation problem including the making of an artificial limb, its proper fitting, etc. Minor controversial aspects of the problem were omitted purposely so that the presentation of the complete subject would not be obscured in any way. In the May, 1946, issue of *Surgery, Gynecology and Obstetrics*, Dr. Francis M. McKeever of Los Angeles, California, has presented a discussion of some controversial points in amputation surgery. In this excellent article the author has based his arguments on his experience with 2,783 cases at the United States Army Hospital in Battle Creek, Michigan. The three references given here will provide the industrial surgeon with concise, compact information for his own amputation library.

The surgeon who worked with amputations at a military center had the great advantage of uniting the patient, the surgeon, and the limb maker under one roof where they could work together in greatest cooperation. This is not always possible in private practice but I cannot repeat too often that the whole problem of an amputation should be visualized clearly at the beginning of the surgeon's work and that his initial operation is only one small part of the total picture. Limb makers throughout the country do not hesitate to remind us frankly that they cannot make up for surgical deficiencies and that the preparation of a good stump is vital for successful walking on an artificial leg. It is relatively easy to fit an artificial leg to a cone-shaped, painless stump of optimum length.

When the temporary dressings and tourniquet are removed from the severely injured limb, three questions must be asked by the surgeon: (1) is the blood supply irreparably damaged? (2) is the infection uncontrollable? and (3) will the limb be useless? If any one or all of these questions can be answered affirmatively, a provisional, guillotine type of amputation is indicated, and it must be done through the site of injury, not through the site of election. I must confess that since my return to private practice I have seen several stumps that were closed primarily at the site of election and all of them resulted in shapes and conditions that were not suited to weight-bearing. With few exceptions, traumatic injuries must have a provisional amputation, left open to heal slowly with the continued use of skin traction, skin grafts, etc. When they are healed, clean, soft and free from infection, a secondary plastic type of revision is done at the site of election or as close to it as is possible. The preferred sites of election are: for above the knee stumps (1) the junction of the middle and lower one-third of the thigh, and (2) the Stokes-Gritti at the knee; for below the knee stumps (1) at a level 5½ to seven inches below the knee, and (2) the Syme's at the ankle joint.

Amputation for diabetic gangrene, arteriosclerosis, etc. does not belong to the province of traumatic surgery and, therefore, the principles of treatment that we have been discussing are not strictly applicable.

There may be adherent scars on the tip end of the stump and possibly other scars on the side. Movement may be painful and the stump too long for good function. The revision operation is, therefore, planned to produce a cone-shaped stump with a minimum of scar tissue or sharp, protruding points of bone. The stump should be as devoid of excess muscle, painful nerve-ends and dog ears as the general condition of the extremity permits. The surgeon should remember that there are only two operations that provide end-bearing stumps: (1) the Stokes-Gritti operation and (2) the Syme's operation. All other operations produce side-bearing stumps, and any excess muscle, fascia or skin on the end of a side-bearing stump does not act as a cushion but is actually a detriment to future weight-bearing.

The healed stump following the revision operation is still not ready for weight bearing and certainly is not ready to be sent to the limb maker. The surgeon must re-examine the entire leg and determine the amount of shrinkage necessary, the degree of atrophy of the hip and thigh muscles, and the possibility of flexion contractures of the knee or hip. When the stump has been shrunk to about one-half its size at the time when the stitches were removed, and when the gluteals, quadriceps and hamstrings have been redeveloped by exercise, then and only then, should the patient be sent to the limb maker. A mechanic, however proficient in his work, has usually not been trained to re-develop or to shrink a stump; that is a surgeon's work. But, if given a good usable stump, a reliable limb maker can turn out a well-made, well-fitting and comfortable leg for the patient.

The first leg should be a temporary pylon or a partially constructed leg in order to allow for more shrinkage. We expect shrinking to continue for a year or more from weight-bearing alone. Frequent observations of the patient's walk (without his clothes on) often reveal that he is developing a habit limp, or a limp due to weak hip muscles, or a limp due to some mechanical imperfection in the artificial limb. When the patient walks well, has no complaint of pain or irritation in the stump and states that he notices no further shrinking, the surgeon's job is finished. I cannot emphasize too strongly the black thoughts I hold for the surgeon who blandly sentences a patient to a life of pain and disability by failing to recognize a useless limb when he sees one, or similar thoughts for the surgeon who dismisses the amputee from his concern when he takes off his gloves in surgery.

IN SUMMARY, the following steps comprise the entire amputation problem:

1. The recognition of indications for amputation:
   (a) Irreparable damage of the blood supply.
   (b) Uncontrollable infection.
   (c) Excessive mutilation and tissue destruction making restoration of function impossible.
2. The initial amputation through the site of injury.
3. The revision operation.
4. The observation of the shrinkage and the redevelopment of the musculature.
5. The fitting of the artificial limb and instructions in its use.

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Edrisal in the Management of Dysmenorrhea

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BETWEEN June 1, 1945, and June 1, 1946, the Medical Department of Bayuk Cigars Incorporated engaged in a study in the control of dysmenorrhea using Edrisal as the sole medication. Edrisal is a tablet containing acetylsalicylic acid and phenacetin a.a. 0.16 (gr. IIss), benzedrine sulphate 0.0025 (gr. 1/26). No comment is needed on the well-established analgesic powers of a combination containing phenacetin and aspirin, but the incorporation of benzedrine sulphate into this prescription has a twofold purpose. First, it tends to overcome the psychologic depression and nervous tension often attendant upon the onset of the menses, secondly, it, too, acts as an actual analgesic. This last fact is very little known. There is both animal and human experimental evidence to show that benzedrine sulphate elevates the pain threshold, and when applied directly to a nerve has an anesthetic action similar to that of novocaine. Elevation of the pain threshold by benzedrine was shown by Kiessig and Orzechowski[1] in 1941 and confirmed by Goetzl[2] and his co-workers in 1944. In 1943 Orzechowski[3] applied benzedrine directly to the sciatic nerve of the decerebrate frog. Reflex stimulation was then attempted, using acetic acid as a stimulus. Benzedrine 0.01% prevented this reaction for 270 minutes while the same concentration of novocaine prevented it for only 57 minutes. In the human subject Taylor[4] reported complete control of menstrual pain in 16 patients, partial control in 12, using benzedrine sulphate alone in doses of 5 to 20 milligrams daily. Brown[5] reported the same results in 45 out of 55 cases using 2.5 or 5 milligrams twice daily.

In studying this drug we set up no control group because we felt that our experience dating back to 1928 with the usual palliative measures for menstrual discomforts would give us sufficient basis for comparison. Our previous technique had been to give an aspirin tablet, and apply a hot water bottle. If there was no relief in 20 minutes, a Hillman "D" capsule was given. If this failed, the employee took one teaspoonful of tincture opii camphorata (paregoric) in a small glass of hot water. If she were still unable to work after all this medication, she was sent home. Our employed group averaged 2,500 women, and we had come to expect that usually five persons per day would seek our help to control their dysmenorrhea, and that one of these five would be sent home daily.

During the year here reported, 774 women sought relief in our Department, all of whom were treated with Edrisal, and no other medication. One hundred and fourty-four of these individuals are lost to this series because they quit their employment before the effects of the drug could be investigated. We are consequently dealing with 630 persons who took a total of 1,460 doses (2,137 pills). There were 783 single doses, and 677 double doses administered. In the early part of the work, all patients were given a single tablet but it soon became apparent that the dosage needed to be more individualized than that, and if one tablet failed to afford relief, two were tried. If the cramps or backache were severe the nurses were instructed to give two tablets as the initial dose. For those women who obtained relief with one tablet, it was found that this dosage usually helped them each time and did not require to be raised. Our results are appraised in terms that mean the same to the patient and the investigator: "complete relief," "partial relief," "no relief," or "made worse."

This study was completed with the technical assistance of ALMA BROWN, R.N., GUSSIE JASPAN, R.N., JANE JONES, R.N., and MABEL REYNOLDS, Medical Secretary. The Edrisal used in this work, and the funds to finance its progress were supplied by the Research Division, Smith, Kline & French Laboratories, Philadelphia, Pennsylvania.

Results

OF THE 630 patients, 329 persons were treated once only. Of these 329, complete or partial relief was obtained for 293 individuals (90%); no relief for 26 (7%); and 10 (3%) were made worse (Table I).

TABLE I. RESULTS ON SINGLE VISIT—329 INDIVIDUALS

	With one pill	*With two pills*
Complete relief	125	122
Partial relief	32	14
No relief	19	7
Worse	8	2

Because of the large factor of success in this group (90%), the conservative and cautious observer will be wise to look also at the failures, small though that percentage may be. One notes that only ten were made worse,—of these two were nauseated, four had worse cramps, one felt nervous, one felt weak, and two were sufficiently uncomfortable to be sent home. Seven obtained relief from cramps with a dosage of one pill, but their cramps returned after three or four hours. Of those who were given two pills, only two persons reported return of cramps. It is well to note also, perhaps, that among those women who obtained relief there were at times comments made by them as to the side effects of the drug: "felt a little nervous," "tired feeling afterwards," "slight dizziness at first," "stopped the nervous feeling," "felt a little nauseated," "flow seemed to stop," and "had a heat flash afterwards."

The success of a pain-relieving agent in a group this size is a happy result, but it would not be fair to judge its merits from patients who had been treated with the drug once only. We feel that the second series, composed of women who visited the Dispensary two to 12 times at recurrent menstrual periods, should prove even more valuable and significant to our conclusions. In this group, too, we were able to assay the effect of the drug in different dosages, as we could not do in the first series.

Table II summarizes our findings in a series of 301 women visiting the Dispensary two to 12 times for dysmenorrhea. Complete relief was obtained for 283 individuals (94%); no relief for 10 (3.4%); and 8 (2.6%) were made worse. In this second group, the successes with Edrisal occurred even more frequently (94%) than in Group I. By seeing each patient more than once we were able to regulate her individual dosage. This explains the entries in the Table concerning those who got no relief with one pill, but achieved a good result with two. Thinking it might be interesting to note the type of relief experienced by these women, a few of their comments follow:

CASE 1. J. U., age 40, was given one Edrisal tablet at the inception of three successive periods with complete relief of her cramps. She commented that this medication was the only one she had ever found that furnished *complete* comfort.

CASE 2. R. P., age 22, has returned for Edrisal medication at the beginning of 10 menses to control cramps and backache. She has done so because she gets complete relief, and "feels wonderful after the medicine." One tablet is usually sufficient for this result.

CASE 3. J. G., age 31, took Edrisal to control

TABLE II. RESULTS ON REPEATED VISITS—301 INDIVIDUALS

	2 visits	3 visits	4 visits	5 visits	6 visits	7 or more visits
Complete or partial relief with single dosage	35	13	2	1	none	none
Complete or partial relief with double dosage	26	9	3	none	none	none
Complete or partial relief with single or double dosage	38	27	24	12	5	12
Complete or partial relief with one visit in which there was no relief—single dosage	12	8	2	5	1	2
Same—with double dosage	6	5	2	5	none	2
Complete or partial relief with two visits in which there was no relief—single dosage	none	3	5	none	1	1
Same—with double dosage	none	none	none	none	1	1
No relief on first visit but complete relief with double dosage	3	3	none	none	none	1
No relief on first two visits but complete relief with double dosage	none	1	1	none	1	1
Same—1st 3 visits	none	none	none	2	none	none
No relief 6 times with single doze —2 pills helped	.....	.....	.....	.....	.....	1
Individuals already counted who got more relief from double dosage than single	2	2	2	1	2	2
No relief at all—single dosage	none	1	none	none	none	1
No relief at all—double dosage	3	none	none	none	none	none
No relief at all—single or double dose	3	none	1	none	none	1
Worse—single dosage	2	none	none	1	none	none
Made worse by two pills	2	2	1	none	none	none
Individuals already counted who were made worse on 1 visit by double dosage	1	none	none	1	none	none

cramps during seven menses. In the first four, her discomfort returned within two to three hours, but her relief was sufficient to continue her work. At the fifth period she was given two tablets as the initial dose, and later reported that "Edrisal is the only thing that has ever given me complete comfort."

A few of the characteristically effective results may also prove interesting in summary:

CASE 4. M. K., age 25, was given two pills on the first day of her April period, resulting in complete cessation of her cramps. For the first time in her industrial life, she was able to work her shift on the initial period day. Previously, cramps had forced her to go home.

CASE 5. E. M., age 29, has taken Edrisal medication to control cramps, backache and headache during 12 consecutive menstrual periods. She has always obtained complete relief. The effect of one tablet wears off within four hours, and she then takes a second pill. Even though she is given two tablets at the first dose, her discomfort returns within the same period of time, and she must be given another tablet.

CASE 6. P. Del., age 24, always absented herself from work or went home, on the first day of her period because of cramps and backache. On her first visit to the dispensary she was given one Edrisal tablet with only partial comfort, but was able to work. At her next period, and at three subsequent ones, two Edrisal tablets gave her complete relief, and her loss of time was abolished.

Opposed then to these 283 successfully treated cases, we have the 10 who were not helped, and the eight who were made worse. Of the latter, three were affected by a dosage of only one pill, two complaining of nausea, and one of backache. Of those made worse by double dosage, one got no relief and was dizzy after taking one pill and fainted after taking two; one was made very nervous; three were nauseated and vomited. There were three isolated cases that were interesting: one girl fainted after taking two pills. She had had two pills on two previous occasions and had excellent results. Another girl was nauseated after taking two pills but had two subsequent visits with the same dosage and excellent results. The third girl was nauseated after taking two pills but had had the same dosage once before with excellent results.

There were seven who said cramps returned after three to four hours and they each had single doses. There were six who said cramps returned after three to four hours whether they took one or two pills, and there were seven who said cramps did not return when they had double dosage.

Since fainting, weakness, nausea, vomiting, severe cramps and backache, and an hysterical tendency are all common symptoms of dysmenorrhea, it is a very difficult matter to judge whether these manifestations occurring after ingestion of Edrisal were due to the action of the drug, or whether they would have supervened in the natural course of the patient's syndrome. For the purposes of this research we have elected to adopt the *"post hoc, ergo propter hoc"* philosophy, and ascribe all untoward results to the medication. Several clinical instances will suffice to illustrate these occurrences:

CASE 1. E. S., age 34, machine oiler. Sought relief for cramps on the first day of her September period. Her discomfort persisted and she had vertigo after one pill. The same dosage caused the same result at her December menses. She did not apply for help again until May, when she was inadvertently given two pills as the initial dose. She had just reached her machine floor again, fainted, and had to be brought to the Dispensary on a stretcher. She revived promptly without medication.

CASE 2. J. K., age 24, machine operator, in December and January obtained complete relief from cramps with two Edrisal tablets. In May, her cramps were more severe, and soon after taking the same dosage she fainted.

CASE 3. H. J., machine forelady, age 27, had been found by the Medical Department to have a mild degree of thyroid overactivity. She was a bit nervous, had slight exophthalmos and a mild tremor. Complaining of cramps at her February period, she was given two Edrisal tablets. Within a short time she returned to the Dispensary highly nervous, with a marked tremor, staring exophthalmos, a positive von Graefe's sign and tachycardia. She was sent home to bed, and the next morning reported to work quite recovered.

One would suspect from these instances that the benzedrine had been responsible for the untoward effect since in each case there were sympathicomimetic symptoms. Those cases showing relief during the first, and often the second, periods, and then poor results in the following period are hard for this observer to explain. At present the only answer we can find is that the same individual will at different times react differently to identical dosages of the same drug.

In our experience with Edrisal we have developed only two contra-indications to its use. We do not give it to a woman known to have, or to have had, pelvic inflammatory disease. We do not give it to an individual with signs or symptoms of thyroid *overactivity.*

The results of this study have been so gratifying that the use of Edrisal has now become standard practice in the Medical Department of Bayuk Cigars, Incorporated, supplanting the former routine for the management of dysmenorrhea. We use it with the knowledge that nine out of 10 sufferers will get the relief they seek, and that without loss of time they can return to the production line in complete comfort. For these reasons we feel the industrial physician, the employee, and the employer will be particularly interested in its use.

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Paraprol as a Prophylactic and Therapeutic Agent in Nickel Dermatitis and Chrome Sores

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THE majority of industrial dermatoses in this country according to Forester,[1] are cases of contact dermatoses due to acids, alkalies, other caustics, oils, greases and solvents. It has been estimated that, in this country, industrial or occupational dermatitis represents about 65% of all occupational diseases.

Dermatitis due to irritants of a chemical nature in industry probably forms a large part of industrial dispensary practice. The etiologic factor may be a combination of mechanical and chemical irritation. This dermatitis may be characterized by various degrees of inflammation and, at times, by the destruction of the cutaneous layers with a possible involvement of the deeper tissues.

Nickel Dermatitis: Chemical dusts may clog the pores, obstructing the outflow of sebum and sweat, resulting in a follicular dermatitis such as produced by nickel dust. Stewart and Cormia[2] constantly produced nickel dermatitis in guinea pigs following cutaneous application of solutions of nickel. They found lesions similar to those described in man as nickel dermatitis, and observed that the intensity of the reaction was in direct proportion to the concentration of the solution used.

Chrome "hole" or "sore": Chromic acid and bichromates are strongly corrosive and irritating to the skin. Exposure to these substances may produce skin changes ranging from mild follicular dermatitis to widespread nodular and crusted eruptions. The chrome "sore" is a characteristic lesion which occurs on the back of the hands and forearms, usually beginning about a hair follicle, or in the creases of the knuckle. The hole begins in a small abrasion and widens as its edges grow thick, eventually forming a cornical indolent ulceration.

Paraprol in Industrial Dermatitis: A large percentage of the cases in our dispensary practice consist of nickel dermatitis and chrome sores, and we are constantly on the lookout for new measures for preventing and treating the latter. We were very much impressed by the reports of Parkes[3] and Dobbins[4] who found that Paraprol affords protection, cleansing, soothing and healing action, all in one formula. On application, Paraprol forms a protective film; the detergent action being supplied by the lauryl sulfoacetate; soothing action by the benzyl alcohol and healing properties by the presence of carbamide. As a result of these reports it was decided to try Paraprol in our plant and dispensary.

Method of Use of Paraprol: Forty employees in the nickel and chrome plating departments were selected for this study. Paraprol was applied locally to exposed parts three times daily; on coming to work, after lunch and before leaving at night. In hot weather more frequent applications were made to the exposed parts. The procedure followed was essentially the one suggested by Parkes[3] and Dobbins[4] in their respective reports.

Results with Paraprol: Nickel dermatitis was readily controlled and the incidence of chrome sores was reduced from ten to twelve to three to four. Paraprol was found to be of particular value in those cases slovenly in their personal hygiene. Scratching, due to an irritating action, was allayed by the application of Paraprol, thus controlling a potent factor in aggravating the dermatitis. Fair complexioned individuals with blond or red hair still continue to manifest nickel rash, although using Paraprol. This may be a degree of sensitivity to the nickel. Once the chrome sore has developed, it is apparently not benefited by treatment with Paraprol.

Summary and Conclusions: Paraprol was found to be effective as a prophylactic measure in forty employees engaged in nickel and chrome plating. It was found to be of particular value in cases shown to be slovenly in their personal hygiene. The incidence of chrome sores was definitely reduced by the use of Paraprol as a prophylactic measure. On the basis of the results obtained, it has been decided to make more extensive use of Paraprol in our plant as a protective, cleansing and soothing agent.

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High Heels

DR. FRANK R. OBER, professor of orthopedic surgery at Harvard Medical School, addressing a surgical conference at the opening of the three-day seventh annual congress on industrial health sponsored in the Copley Plaza Hotel by the A.M.A., asserted that one of the commonest causes of fatigue in industry was the improperly shod foot. He was no fuddy-duddy, however, who warned against modern styles. His only insistence was that the shoe would fit the foot in a way to guarantee proper support, and he suggested that such fit could be obtained more easily if the average customer refused to let the clerk sell and insisted, instead, on buying shoes to meet his individual needs. He was opposed to orthopedic shoes generally, but, unlike many health specialists, he did not condemn open-toed or platform shoes. Some women—and some men—need comparatively high heels on their shoes for health and comfort, he said, warning that too low, as well as too high a heel could cause leg strain and cramps.

—*Boston Herald*, October 1, 1946.

Lowering Personnel Turnover

—A Mutual Must of the Industrial Health and Industrial Relations Services—

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DURING the war years the Pacific Coast demanded an increment of working manpower without precedent in any previous conflict. Being a moderately* populated area, apart from specific metropolitan centers, there was a paucity of craft workers when the great need arose in shipbuilding, agriculture and transportation. These hundreds of thousands of people flowing through the clock-alleys daily had to be recruited from among the non-essential industries, or brought at considerable cost from middle western and eastern areas of greater population density.

The creation of such migratory movements brought in its wake housing shortages, overburdening of community agencies, and health problems, which when added to the supply demands of the many service installations, led to resentments, nostalgias, and insecurities—all of which could not be compensated for by the big paycheck. These voluntarily displaced persons, in many instances, became malcontents desiring only to return home, and so a labor turnover problem was added to that of caring for those staying on. The percentage of a plant population requiring periodic replacement varied from one center of industry to another but, in each, the personnel directors were attempting constantly to replenish increasing losses. Leaders were forced to install facilities in their plants that heretofore had been seen but rarely—in-plant health service, cafeterias, improved change rooms, accessible transportation, recreation, safety equipment, and among the most important, employee counselling services. These new workers had to be kept on the job at all costs, and there was never question as to the necessity for a worker program aimed at reduction of personnel turnover.

The Local Scene

THE San Francisco Port of Embarkation, an Army Transportation Corps installation responsible for the shipping of men and materiel to the Pacific bases, faced the same situation in attempting to retain those workers procured through such costly recruiting programs. The Personnel Division, early in its war career, established under its Civilian Personnel Branch, an Employee Relations Section wherein the problems of housing, transportation, workmen's compensation, feeding, worker mal-adjustments, and grievances were cared for.

The Industrial Health Branch, the activities of which have been described in a previous communication,[1] had cooperated completely in solving individual employee problems. Soon it was seen that a definite program required development, allying the two sections that would strive towards keeping the dissatisfied worker on the Port rolls. Admittedly, it was the function of the Employee Relations Section to interview all individuals desiring to terminate their services—and, with the great number of service wives and migrants as employees, this was not an inconsiderable group.

*In 1940 the states of California, Oregon, and Washington had a population of 9,733,262 as contrasted with 13,479,142 for New York State alone or Pennsylvania with 9,900,180 (ALLEN, C. L., ed. Chicago Daily News Almanac for 1941, Chicago, Chicago Daily News Inc., 1946).

Developing the Answer

MANY of these workers, it was discovered, were leaving because of self-declared "ill-health." This factor surpassed the scope of a termination interview program, so it was agreed mutually that all prospective terminees, offering health as the motivating force, would be interviewed on their leaving, by the Industrial Medical Service in addition. This exit-interview system saw its inception early in 1944 and, within the next year and a half, saw a successful development. In brief, any employee who claimed that he wished to leave the Port because of his physical condition, because of impaired health, or because of working conditions affecting him adversely, would be referred to the Medical Section for interview. A brief note, under cover, would accompany him with the basic facts described by the referring counsellor.

The Study

THE present series includes 183 cases studied mutually under the above referral system. Of this number, 131 were men and there were 52 females. These represent 71.5% and 28.5%, which approximates quite closely the total number of employees, by sex incidence, in the Port population group at that time.

TABLE 1.
EMPLOYEES DESIRING TERMINATION BECAUSE OF ALLEGED ILL-HEALTH*

MALE		FEMALE	
Number	Percent	Number	Percent
131	71.5%	52	28.5%

*Hereinafter referred to as "Employees."

In Tables 2 and 3 may be seen the age incidence of these employees.

TABLE 2.
AGE INCIDENCE OF EMPLOYEES

Age	Number	Percent
16—19	10	5.46
20—29	39	21.32
30—39	39	21.32
40—49	42	22.96
50—59	30	16.39
60—69	20	10.92
70 & over	3	1.63
Aggregate	183	100.00%

TABLE 3.
AGE INCIDENCE OF EMPLOYEES BY SEX

MALE			FEMALE		
Age in Years	Number	Percent	Age in Years	Number	Percent
16—19	4	3.05	16—19	6	11.54
20—29	18	13.74	20—29	21	40.38
30—39	23	17.60	30—39	16	30.77
40—49	35	26.71	40—49	7	13.46
50—59	28	21.36	50—59	2	3.85
60—69	20	15.26	60—69	0	0
70 & over	3	2.28	70 & over	0	0
Aggregate	131	100.00%	Aggregate	52	100.00%

Statistics are not available as to the frequency of the age groups for a comparable period for the entire civilian employee personnel, but it has been shown that, in a survey of over 10,000 pre-placement physical examinations[2] conducted during the same length of time, the greatest proportion of new employees was in the 20 to 29 year old bracket with the 30 to 39 year grouping second. Of terminating workers there is equality, essentially, among the 20 to 29, 30 to 39, and 40 to 49 year old brackets.

The marital status of this group is demonstrated in Tables 4 and 5.

TABLE 4.
MARITAL STATUS OF EMPLOYEES

Status	Number	Percent
Single	50	27.33
Married	116	63.38
Widowed	5	2.73
Divorced	12	6.56
Aggregate	183	100.00%

TABLE 5.
MARITAL STATUS OF EMPLOYEES BY SEX

MALE			FEMALE		
Status	Number	Percent	Status	Number	Percent
Single	31	23.66	Single	19	36.53
Married	89	67.97	Married	27	51.93
Widowed	2	1.51	Widowed	3	5.77
Divorced	9	6.86	Divorced	3	5.77
Aggregate	131	100.00%	Aggregate	52	100 .00%

During the war years, the Port of Embarkation averaged approximately 8 to 10% colored workers, so the figures seen in Tables 6 and 7, are not at variance with this specific group at large. The large number of Filipino (brown) seamen employed on United States Army Transports rarely left because of ill-health, and the number of Chinese workers was negligible among the many thousands.

TABLE 6.
RACE INCIDENCE AMONG EMPLOYEES

Race	Number	Percent
White	157	85.79
Colored	21	11.40
Yellow	3	1.63
Brown	2	1.18
Aggregate	183	100.00%

TABLE 7.
RACE INCIDENCE AMONG EMPLOYEES BY SEX

MALE			FEMALE		
Race	Number	Percent	Race	Number	Percent
White	110	83.99	White	47	90.39
Colored	17	12.99	Colored	4	7.69
Yellow	2	1.51	Yellow	1	1.92
Brown	2	1.51	Brown	0	0
Aggregate	131	100.00%	Aggregate	52	100.00%

A glance at the breakdown of occupational classifications, Table 8, will show that the largest number of employees per job title (dockseamen for the males, and clerk for the females) was paralleled in the group desiring termination.

TABLE 8.
OCCUPATIONAL CLASSIFICATIONS OF EMPLOYEES

MALE		FEMALE	
Occupation	Number	Occupation	Number
Dockseaman	37	Clerk	32
Patrolman	11	Chauffeur	3
Helper*	9	Patrolwoman	3
Laborer	9	Crafts Trainee	2
Carpenter	8	Others	12
Rigger	7		
Machinist	5		
Tallyman	5		
Welder	5		
Clerk	3		
Electrician	3		
Painter	3		
Truck Driver	3		
Others	23		
Aggregate	131	Aggregate	52

*Includes Electrician's Helper, Machinist's Helper and Mechanic's Helper.

As all occupations represented were so few in number, percentage values are not presented. The highest of each sex group was: Male—Dockseamen: 28.24% and Female—Clerk: 61.05%.

The Interpretation

FROM the above, it may be seen that the majority of employees desiring to leave for reason of ill-health were married males in the forty year age group, and married 20 to 29 year old women. Quite frequently the excuse "ill health" was the simplest device employed by the worker as a cover-up of the true reason for terminating, which in many instances was employment elsewhere at higher wages. This was usually the case as Federal employment could not meet the attractive pay scale of private industry which, on the Pacific Coast, meant the shipyards. Others, desiring to return home, would use what they felt to be the excuse least likely to be investigated.

In addition, the dockseamen represented a large number of workers recruited from San Francisco's skid-row, whose iterancy in employment was well known. The better-than-peacetime paycheck caused no end of absenteeism among this group, in addition to the turnover. Many of the female clerks were service wives who desired to return to their state of origin when their husbands sailed for overseas. Clearance by the Personnel authorities was needed for these workers were "frozen" in their jobs by the War Manpower Commission,[3] and selecting ill-health as an excuse was, to them, the most seemingly successful manner of changing employers.

The higher number of married women desiring termination bespeaks the ever-present truth, that a working woman always has two jobs—home and the office. Furthermore, by 1944 the glamour of the girl with the welding torch had begun to wear off, and returning veterans had started to filter back to replace the women whose patriotic fervor had diminished.

The Results

WITH this background material known to those endeavoring to limit the worker turnover, an effort was made to investigate each case to determine if, (a) a remedial physical condition existed; (b) a job change would aid in retaining the worker; (c) a shift change would preclude the employee's leaving; (d) a period of sick leave would obviate the termination, or frankly; (e) the individual's reason of ill-health were true, non-remedial locally, and termination or release should be advised.

Each case was investigated by means of an extensive (and in psychiatric cases, intensive) interview, a complete physical examination, diagnostic laboratory procedures, and specialist consultations at civilian medical agencies when indicated. The recommendations of the medical staff were forwarded then to the counseller, who took the action indicated. If further conference were desired, the supervisor concerned would enter the scene, and the three sections would attempt to make a rational decision.

The following statistics show the results obtained:

TABLE 9.
RESULTS OF MEDICAL INTERVIEWS WITH EMPLOYEES

Action	Number	Percent
Complaint verified and employee terminated	47	25.68
Complaint verified—effect job transfer if possible, otherwise terminate	9	4.92
Complaint verified—status change effected, employee not terminated	78	42.62

TABLE 9—Cont.
RESULTS OF MEDICAL INTERVIEWS WITH EMPLOYEES

Action	Number	Percent
Job restrictions placed	30	38.46
Job change effected	15	19.23
Sick leave granted	12	15.38
Change of job location	10	12.82
Change of hours effected	4	5.13
Specific medical care instituted	4	5.13
Shift change effected	3	3.85
Aggregate	78	100.00%
Complaint not verified—employee not terminated	49	26.78
Aggregate	183	100.00%

It is of interest to note the diagnostic breakdown of those workers allowed to terminate:

TABLE 10.
DIAGNOSTIC CLASSIFICATION OF EMPLOYEES TERMINATED

Classification of Disease Groups	Number	Percent
Allergy	9	19.14
Neuro-Psychiatric	8	17.03
Cardio-Vascular-Renal	5	10.64
Orthopedic	5	10.64
Gastro-Intestinal	4	8.51
Ear—Nose—Throat	3	6.38
Genito-Urinary	3	6.38
Pregnancy	3	6.38
Congenital Defects	1	2.13
Dermatologic	1	2.13
Respiratory	1	2.13
Tuberculosis	1	2.13
Unknown	3	6.38
Aggregate	47	100.00%

The nine cases of allergy usually presented the moot question of the employees' desiring to move to a "warmer," or to a "colder," or to a "drier," or to a "more moist" or just to a "better climate. The neuro-psychiatric patients were in most instances frank psychotics whose leaving would do nothing but better the conditions of those remaining.

The percentage of individuals refused clearance (26.78%) indicate the great number whose statement of alleged ill-health could not withstand exhaustive investigation. This is of importance from the point of view of the industrial health program, for what general impression is gained from reviewing a list of employee terminations, only to find so many individuals under the heading ill-health? It infers poor working conditions, poor medical facilities, poor caliber of worker, poor industrial relations, and perhaps, poor community medical facilities. It is better, by far, to rehabilitate these workers, for that is actually what is being done, than to allow them terminations without benefit of medical counsel.

The number of employees in whom a remedy of the maladjustment had been effected, i.e., change of job, change of hours, change of location, etc. (42 to 62%) indicates the satisfying work that can be accomplished by a medical service in industry. These workers were retained to finish out their contribution to the civilian effort in the war and probably, with no period of unemployment intervening, the families of this group suffered less.

In some instances (4.92%), it was not always possible to find the suitable answer within the Port's employment field, and also a job change may not be feasible because of differences in salary level, previous training, physical capacity, or temperament. It was hoped that all such workers could become relocated intramurally so as to obviate the necessity for termination.

It is true that the number of workers discussed represented a fraction of all those leaving because of other motivating forces, but as noted previously[4] the United States Civil Service Commission has expressed the wartime cost of replacement of an industrial worker to be $250.00. So if, as in this case, 136 individuals did not require replacement, a total of $34,000 was saved in operating expenses.

Personnel turnover is a necessary evil of today's industrialization, but every effort must be directed toward minimizing this fruitless activity. A more cohesive organization, a better worker morale, and of greatest importance, an increased production record will result when common sense investigative methods are used in isolating and curing the basic complaints of the worker desiring to leave.

Summary and Conclusions

THE wartime Pacific Coast saw an influx of workers that soon created a costly problem of a high employee turnover.

2. An Army installation feeling this problem, established a close liaison system between the industrial health and employee relations sections to effect a mutual study of workers desiring to terminate because of alleged ill-health.

3. Of the group of 183 workers, 71.5% were male, and females represented 28.5%.

4. The age incidence was fairly well distributed with a slight majority in the 40 to 49 year group; 40.38% of the women, however, were of the 20 to 29 year old bracket.

5. Married workers outnumbered the single in both sexes in this study group.

6. The racial percentages were no higher than they appeared in the non-terminating worker population.

7. The highest prospective turnover occurred in the numerically leading occupations of the installation, i.e., dockseaman (M) and clerk (F).

8. Through an investigation consisting of a complete physical examination, diagnostic laboratory examinations, and specialist consultations, 26.78% were not terminated, 42.62% had their job status changed, 4.92% had job transfers arranged for in the near future, and 25.68% had their complaints verified and were terminated. Of those leaving employment, allergic and neuro-psychiatric conditions were the most frequent medical findings.

9. It is mandatory that the industrial health service minimize the number of terminating employees who use "ill-health" as their reason, for it bespeaks poor industrial and community relations.

10. An active, well integrated program embodying the important functions of two "personal" within-plant agencies will lower an unnecessarily high rate of worker turnover.

[Grateful acknowledgement is extended to MISS KAY BUTLER for the inception of the policy described, and for her "ditch-digging" energy in activating its early stages.]

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SEE PAGE 7 for the interesting program of the Midwinter Scientific Meeting of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY, at the Palmer House, Chicago, on Friday, December 6, 1946. The morning session is devoted to a "Pathological Conference" at St. Luke's Hospital.

Fractures of the Lower End of the Radius and Ulna

—Commonly Classified as Colles' Fractures—

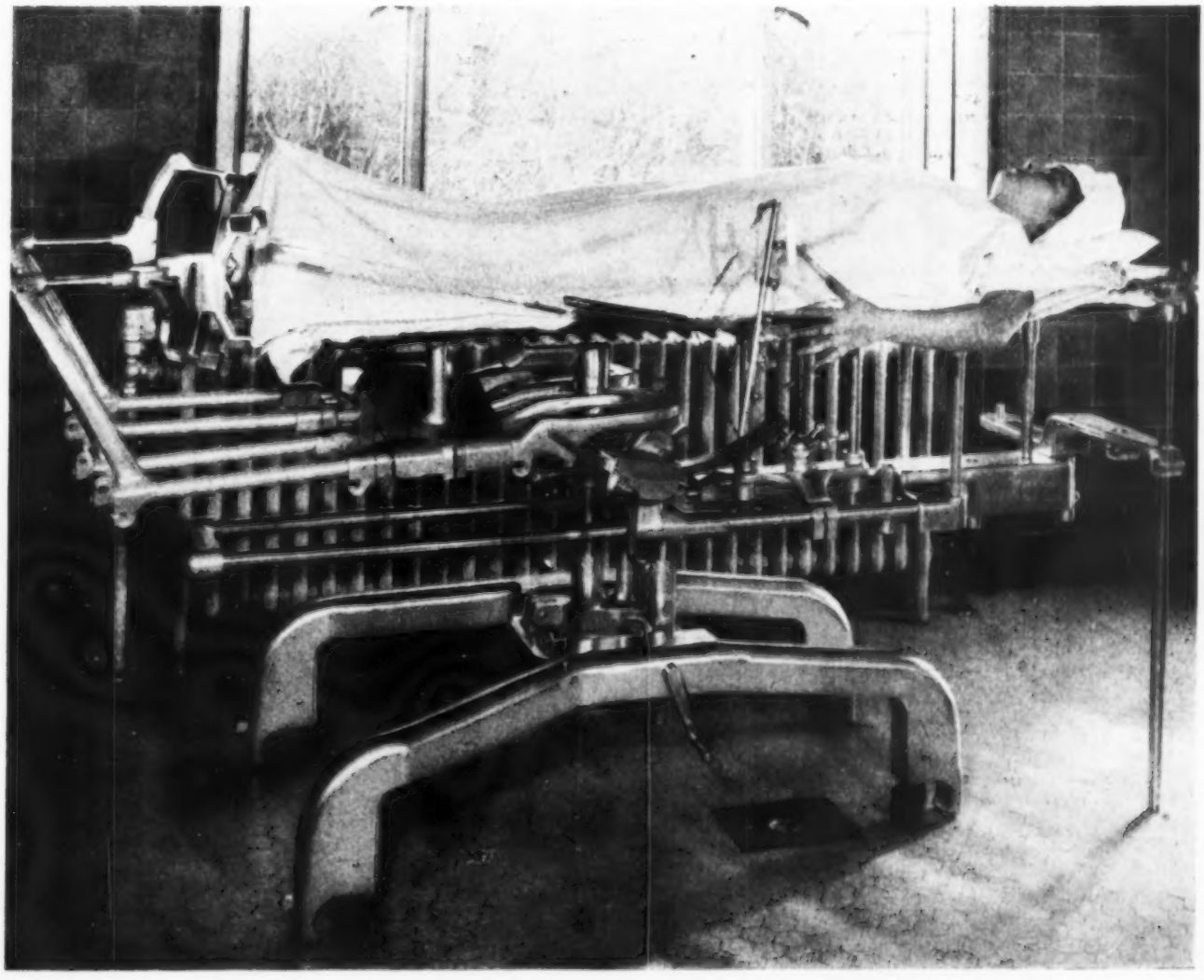
WM. JOHNSON, M.D., B. E. MALSTROM, M.D., E. G. BEHRENTS, M.D.

FRACTURES of the lower end of the radius and ulna, commonly classified as Colles' fractures, occur through a fall on the outstretched hand, or a direct blow on the wrist. The fracture occurs 1½ to 2 cms. above the joint margin, with or without displacement, with or without comminution, and with or without injury to the radio-ulnar joint. Usually, however, this distal fragment, bearing with it the hand, is displaced backward and upward with reference to the proximal fragment, causing a shortening of the hand upon the forearm. At the same time, the distal fragment tilts backward, so the articular surface of the radius looks backward instead of slightly forward into a typical silver-fork deformity. The distal fragment is usually slightly rotated in the direction of the thumb in relation to the proximal fragment.

Should this fracture be complicated by injury to the triangular ligament or a comminution into the radio-ulnar joint, the functions of pronation and supination of the forearm are greatly impaired. This loss or impairment causes grave disability. The function of supination and pronation is obtained through the rotation of the radius around the ulna by means of the proximal and distal radio-ulnar joints. The ulna plays a purely passive part, serving as a fixed point about which the radius rotates. The proximal ends of the radius and ulna are held together by the annular ligament. The distal ends of the radius and ulna are held in approximation by means of the triangular ligament. When the fracture occurs through this site or the ligament is torn, there is a broadening of the wrist joint and a definite impairment of motion if this is not corrected.

It is the purpose of this paper to describe an excellent method of traction-reduction of fractures about the wrist, described by Dr. R. D. Joldersma, in *Surgical Clinics of North America* in 1948, and a method of external pin fixation of the reduced fracture as described by Dr. Roger Anderson in the April, 1944, issue of *Surgery, Gynecology & Obstetrics*. I feel that this method of reduction eliminates the danger of permanent damage being done to tendons, nerves and vessels caused by forceful manipulation of the fragments during reduction, and this method of fixation insures against mal-alignment which so frequently occurs in a cast during the period of healing.

As to the method of traction reduction described by Joldersma, let me quote: "The art of traction as expounded by Bohler seems to have been completely missed or, perhaps, forgotten. The method I have personally used for 10 years employs fixed traction, as described by Bohler, plus the old Chinese finger trap, as developed by Caldwell. Our addition has been using a single spring scale in the traction, and a definite amount of measured traction for a fixed period of time. To use fixed traction properly, one must bear in mind the principles of traction. The extremity must be so



Review of 110 Cases of Skeletal Pinning and External Fixation

Humerus

1. Fifteen fractures treated by pinning and external fixation.
2. Age range:
   (a) Average age—49.1 years.
   (b) Oldest 89 years—youngest 6 years.
3. Total hospital days, 241 days; Average 16 days.
   Longest 42 days; age 70-80.
   Shortest 4 days; age 10-20.
4. Duration of fixation:
   (a) Upper 3rd—40.2 days.
   (b) Middle 3rd—53 days.
   (c) Lower 3rd—28 days.
5. Sex: 5 male; 10 Female.
6. Anesthetic: Upper 3rd—7 Pentothal.
   3 Local.
   Middle 3rd—4 Pentothal.
   Lower 3rd—1 Pentothal.
7. Mortality rate: 1. 75 years Upper 3rd.
8. Supplementary Treatment:
   Upper 3rd—3 out of 10 had diathermy, massage and passive exercise.
   Middle 3rd—4 out of 4 had diathermy, massage and passive exercise.
   —1 had splint applied.
   Lower 3rd—1 out of 2 had diathermy, massage and passive exercise.
9. Complications:
   (a) Upper 3rd—1 Osteoporosis, age 72.
   —1 Pathological fracture through old giant cell tumor of humerus.
   (b) Middle 3rd—1 Angulation, age 12 years.
   —1 Pin drainage and calcification of acromio-clavicular ligament; age 60.
   —1 Delayed union, age 40.
   (c) Lower 3rd—1 Pin drainage and angulation, age 6.
10. Results:
    (1) Upper 3rd—
    1. Anatomical 6 classed A; 2 classed B.
    2. Physiological 6 classed A; 1 classed B; 1 classed C.
    3. Functional 6 classed A; 1 classed C.
    (b) Middle 3rd—
    1. Anatomical 2 classed A; 2 classed B.
    2. Physiological 2 classed A; 1 classed B; 1 Incomplete.
    3. Functional 3 classed A; 1 classed Incomplete.
    (c) Lower 3rd—
    1. Anatomical 1 classed B.
    2. Physiological 1 classed B.
    3. Functional 1 classed A.

Forearm

1. Number of fractures treated by pinning and external fixation: 21.
2. Age range: Average age 49.5 years.
   Oldest 75 years; youngest 9 years.
3. Total Hospital Days 71. Average: 3.4 days.
   Longest stay, 26 days; shortest stay, 0 days.
4. Duration of Fixation:
   (a) Colles, average 31 days.
   (b) Both Bones Middle 3rd: average 37 days.
5. Sex: 6 Males; 15 Females.
6. Anesthetic:
   (a) Colles: 19 Pentothal.
   (b) Both Bones Middle 3rd: 2 Pentothal.
7. Mortality rate:
   (a) Colles—None.
   (b) Both Bones Middle 3rd—None.
8. Supplementary Treatment:
   (a) Colles:
   1. 10 out of 19 had diathermy, massage and passive exercise.
   (b) Both Bones Middle 3rd:
   1. 1 out of 2 had cast applied.
   2. 1 out of 2 had light cast applied and diathermy, massage and passive exercise.
9. Complications:
   (a) Colles:
   1. 2 out of 19 had pin drainage and painful pin.
   2. 1 out of 19 had loss of flexion.
   3. 1 had beginning ischio-paralysis before reduction (claw-hand).
   4. 1 had traumatic neuro-circulatory disturbance and loss of reduction due to removing skeletal fixation before firm callus was formed.
   5. 1 had chemical dermatitis of left hand and wrist.
   (b) Both Bones Middle 3rd:
   1. No complications in 2 cases.
10. Results:

(a) Colles:	(b) Both Bones Middle 3rd:
(a) Colles:	(b) Both Bones Middle 3rd:
1. Anatomical:	1. Anatomical:
15 classed A.	1 classed A.
3 classed B.	1 classed B.
1 classed C.	
2. Physiological:	2. Physiological:
15 classed A.	1 classed A.
2 classed B.	1 classed B.
2 classed C.	
3. Functional:	3. Functional:
16 classed A.	1 classed A.
1 classed B.	1 classed B.
1 classed C.	
1 Incomplete.	

Femur

1. Forty-five Fractures treated by pinning and external fixation.
2. Age range:
   A. Average age: 67.1 years.
   B. Oldest: 87 years.
   C. Youngest: 14 years.
3. Total Hospital Days: 1204. Average 37.6.

	Longest	Shortest
*A. Intracapsular	93 days	12 days
B. Intertrochanteric	130 days	13 days
C. High Shaft	120 days	21 days
D. Middle Third	75 days	6 days
E. Lower Third	31 days	5 days

*Smith-Peterson nail used.

4. Duration of Fixation: Sex; Mortality Rate.

	No.	Average	Longest	Shortest	Sex: Males	Sex: Females	Mortality Rate
A. Intracapsular	14	One 365 11 Perm	.....	.....	2	12	2
B. Intertrochanteric	16	114 Da.	2 Perm 131	65	8	8	8
C. High Shaft	6	3 Perm.	.....	.....	2	4	3
D. Middle Third	5	95 Da.	139	61	3	2	0
E. Lower Third	4	101 Da.	133	70	2	2	1

5. Anesthetic:

A. Intracapsular	7 Pentothal	1 Local	1 Local and Pentothal
	3 Spinal	Expired	1 Local and Pentothal
			1 Local
B. Intertrochanteric	5 Pentothal	2 Local	1 Spinal
	7 Local	Expired	1 Pentothal
C. High Shaft	2 Pentothal	1 Local	
		Expired	2 Pentothal
		1 Local	
D. Middle Third	5 Pentothal		
E. Lower Third	1 Pentothal	2 Spinal	
		Expired	1 Local

6. Supplementary Treatment:
   A. Intracapsular—14 cases.
   1 had exercise (passive).
   1 had hip reconstruction.
   1 had pin removed.
   B. Intertrochanteric—16 cases.
   1 had diathermy, massage and passive exercise.
   C. High Shaft—6 cases.
   None.
   D. Middle Third—5 cases.
   2 had diathermy, massage and passive exercise.
   2 had cast applied, one with walking caliper.
   E. Lower Third—4 cases.
   2 had cast applied.
   1 had hot packs.
   1 had diathermy, massage and passive exercise.
7. Complications:
   A. Intracapsular.
   1 had serous drainage from incision.
   1 had aseptic necrosis of head with evulsion.
   1 had painful hip, flattening of head of femur.
   1 asthmatic expired.
   1 had diabetes.
   1 had infection and senile arteriosclerosis and expired.
   B. Intertrochanteric:
   4 had chronic myocarditis and expired.
   1 had pain in right knee.
   1 had acute hemorrhagic cystitis.
   1 had cardiogenic shock and expired.
   1 had pin drainage and expired 87 days after injury.
   1 expired at home from starvation.
   1 had old age osteoporosis.
   C. High Shaft:
   1 had cerebral arterio sclerosis and delayed union.
   1 had pain due to inadequate fixation, Hypertension with cerebral accident 2 years previous. Expired.
   1 had diabetes and coronary disease, expired.
   1 expired 20 days after injury. Convulsions of arteriosclerotic nature.
   D. Middle Third:
   1 had temporary stiffness and pain.
   1 had pin drainage, abscess on medial side of thigh; Osteoporosis of the distal fragment.
   1 had drainage under cast where pins were present. 27° angulation laterally and 1° anteriorly at fracture site.
   E. Lower Third:
   1 had maggots around pins.
   2 had pin drainage.
   1 had large gangrenous ulcer around lower pin in left leg.
8. Results:
   A. Intracapsular:

(1) Anatomical:	(2) Physiological:	(3) Functional:
8 classed A.	9 classed A.	9 classed A.
4 classed B.	1 classed B.	3 classed C.
2 classed C.	2 classed C.	

   B. Intertrochanteric:

(1) Anatomical:	(2) Physiological:	(3) Functional:
13 classed A.	6 classed A.	5 classed A.
2 classed B.	1 classed C.	
1 classed C.		

C. High Shaft:

(1) Anatomical:	(2) Physiological:	(3) Functional:
2 classed A.	2 classed A.	2 classed A.
2 classed B.	1 classed C.	1 classed C.
2 classed C.		

D. Middle Third:

(1) Anatomical:	(2) Physiological:	(3) Functional:
3 classed A.	3 classed A.	3 classed A.
1 classed B.	2 classed B.	2 classed B.
1 classed C.		

E. Lower Third:

(1) Anatomical:	(2) Physiological:	(3) Functional:
2 classed A.	3 classed A.	3 classed A.
2 classed B.		

Deaths from Intracapsular Fractures..... 2
Ages 72 and 82. Percentage 14%.
Deaths from Intertrochanteric..... 8
Ages 72, 77, 81, 77, 84, 67, 87 and 84. Percentage 50%.
Deaths from High Shaft..... 3
Ages 80, 68 and 82. Percentage 50%.
Deaths from Lower Third..... 1
Age 80. Percentage 25%.
Deaths from Upper Third, Humerus..... 1
Age 75. Percentage 6-2/3%.

LOWER LEG

1. Twenty fractures treated by pinning and external fixation.
2. Age range: Average age 39.5; Oldest 69; Youngest 12.
3. Hospital Days: Average 8.7 days.
   A. Upper Third: Longest 31; Shortest 2.
   B. Middle Third: Longest 11; Shortest 2.
   C. Lower Third: Longest 20; Shortest 1.
4. Duration of Fixation—Average:
   A. Upper Third: 64 days.
   B. Middle Third: 101 days.
   C. Lower Third: 73 days.
5. Sex: 10 Males; 10 Females.
6. Anesthetic—Pentothal in all 20 cases.
7. Mortality Rate—None.
8. Supplementary Treatment:
   A. Upper Third: 2 cases.
      (1) 2 casts applied and one had physiotherapy.
   B. Middle Third: 4 cases.
      (1) 1 had a cast applied and physiotherapy.
      (2) 1 had drilling of delayed union.
   C. Lower Third: 14 cases.
      (1) 6 had casts applied.
      (2) 9 had diathermy.
9. Complications: A. Upper Third: 2 cases.
      (1) None.
   B. Middle Third: 4 cases.
      (1) 1 had delayed union.
      (2) 1 had pin drainage.
      (3) 1 had phlebitis and abscess of lower left leg.
   C. Lower Third: 14 cases.
      (1) 3 had pin drainage.
      (2) 1 had stiffness.
      (3) 1 had delayed union.
      (4) 1 had pain on motion at fracture site.
10. Results: A. Upper Third:
      (1) Anatomically —1 classed A. 1 classed C.
      (2) Physiologically—1 classed B. 1 classed A.
      (3) Functionally —1 classed A. 1 classed B.
   B. Middle Third:
      (1) Anatomically —4 classed A.
      (2) Physiologically—4 classed A.
      (3) Functionally —4 classed A.
   C. Lower Third:
      (1) Anatomically —12 classed A.
      (2) Physiolog cally—11 classed A.
      (3) Functional —10 classed A.

MANDIBLE

1. Three fractures treated by pinning and external fixation.
2. Age range: Average 37. Oldest 38. Youngest 35.
3. Hospital days: Average 6. Longest 10. Shortest 4.
4. Duration of Fixation: Average 79 days. Longest 105. Shortest 33.
5. Sex: 2 Males. 1 Female.
6. Anesthetic: 3 local.
7. Mortality rate: 0.
8. Supplementary Treatment: None.
9. Complications: 2 had pin drainage.
10. Results:
      (1) Anatomically 2 Classed A. 1 Classed B.
      (2) Physiologically 3 Classed A.
      (3) Functionally 3 Classed A.

METACARPALS

1. One fracture treated by pinning and external fixation.
2. Age 34.
3. Hospital days 15.
4. Duration of fixation, 50 days.
5. Sex, male.
6. Anesthetic—Pentothal.
7. Mortality Rate—0.
8. Supplementary treatment:
   Cast applied and Ace Bandages.
   Open reduction second metacarpal.
   Anti-luetic treatment.
9. Complications: Non-union.
10. Results: (1) Anatomically C; (2) Physiologically C; (3) Functionally C.

BONES OF THE FOOT

1. Six fractures treated by pinning and external fixation.
2. Age range: Average 36; Oldest 69; Youngest 14.
3. Hospital days: Average 6 days.
   A. Os Calcis — 9 days. Longest 11; Shortest 8.
   B. Astragalus —11 days.
   C. Metatarsals— 5 days.
4. Duration of Fixation:
   A. Os Calcis — 58 days.
   B. Astragalus — 65 days.
   C. Metatarsals— 53 days.
5. Sex: 3 Males; 1 Female.
6. Anesthetic: 3 Pentothal; 1 Local.
7. Mortality rate—0.
8. Supplementary Treatment:
   A. Os Calcis —1 cast applied and 2 had diathermy.
   B. Astragalus —1 cast applied and 1 had diathermy.
   C. Metatarsals—None.
9. Complications:
   A. Os Calcis —4 cases. 1 had pin drainage.
   B. Astragalus —None. 1 case.
   C. Metatarsals—None. 1 case.
10. Results:
   A. Os Calcis:
      (1) Anatomically —4 classed A.
      (2) Physiologically—1 classed A. 3 classed B.
      (3) Functionally —1 classed A. 3 classed B.
   B. Astragalus:
      (1) Anatomically —1 classed A.
      (2) Physiologically—1 classed B.
      (3) Functionally —1 classed B.
   C. Metatarsals:
      (1) Anatomically —1 classed A.
      (2) Physiologically—1 classed A.
      (3) Functionally —1 classed A.

postured that all muscles involved, extensors and flexors are in physiological equilibrium. If continuous fixed traction is then applied for a period of time sufficient to tire the muscles completely, a hollow muscle tube will result, with equalized tension on all sides of the bone, so that fractured and displaced fragments, under the gentle equalized pressure, seek their proper positions."

The technique of reduction as employed by us, varies slightly as compared to the one described by Joldersma in that we use: (1) sodium pentothal anesthesia. (2) The arm is abducted 90° from the body, the elbow is 90° to the upper arm, the arm is fastened to an upright bar, held in fixed position at the head end of the Tower Table by means of a canvas sling. The forearm is placed in pronation and the finger traps are applied over adhesive placed on each side of each finger to protect the skin. The finger trap is then fastened to the spring scale, whose free end is attached to the foot-piece of the Tower Table, and 15 pounds of traction are then applied. The pull on the bar of the finger trap is so balanced that the hand is in ulnar deviation. The traction is maintained for 15 minutes, during which time the extremity is prepared, i.e., shaved, scrubbed and painted, and a 4 in. 3/32-pin is inserted transversely through the middle half of the metacarpal bone of the thumb. The two bar clamps are slid onto the free ends of the three-inch U-bar, and the U-bar is then attached to the pin by means of two pin clamps, then a 4 in. 3/32-pin is inserted into the cortex of the radius at an angle toward the thumb, approximately two inches proximal to the fracture site and through the cortex on the opposite side of the radius. The second pin is inserted into the cortex of the radius three inches proximal to first pin, at angle toward the elbow, through the cortex on the opposite side. These two pins are attached to a six-inch straight bar onto which a bar clamp has been placed in position to come to lie half-way between the two pins inserted into the radius. These are locked in position and a second bar clamp is slid onto the distal free end of this half-pin unit. Two bars of sufficient length are inserted into the bar clamps of the previously described U-bar and the two bar clamps on the straight bar of the half-pin unit.

The wrist is then grasped in such a manner that slight pressure can be applied upon the distal fragment of the radius on its dorsal surface to correct the backward tilt of the articular surface of the radius. The apparatus is locked in a position of ulnar deviation by an assistant. Postoperative x-ray usually shows the fragments in good position and alignment and they are maintained in such a position by means of the fixation apparatus, which continues to maintain traction during the six to 10 weeks healing period, without fear of loss of reduction, while the callus forms and hardens.

In order to show the articular surface of the wrist joint to the best advantage, a special technique for lateral views should be used: DRS. PARKER and CULPEPPER, in the February, 1946, issue of INDUSTRIAL MEDICINE, describe an excellent technique: "In order to determine this relationship, we have devised a technique of placing the tube at a 25° angle, pointing toward the thumb, and with the Cassette parallel to the forearm on the radial side of the arm."

In comminuted fractures, the traction reduction method with pin fixation usually results in a smooth articular surface. When the triangular ligament is torn, equally good results are obtained by continuous traction. In our experience, it usually requires from six to 10 weeks for callus to be visualized on the x-ray. Fixation is maintained in every case until callus is demonstrated, and sufficient time has elapsed for the callus to consolidate. Patients suffering from such injuries, who do not have complicating arthritis, usually are free from pain after 72 hours following reduction and fixation, and are encouraged to use their hand as much as possible. Many of them resume their previous occupations, such as housewives, farm hands or factory workers, with practically no loss of time.

In summarizing, I am presenting a combined and accepted technique of reduction and external fixation, as described by Joldersma and Roger Anderson, modified slightly to fit our local convenience. Our modifications are: (1) We use a complete anesthesia. (2) We use the finger trap attached to the tower table, as previously described, making a very positive method of reduction; and (3) while the finger trap method is reducing our fracture, we apply a Roger Anderson apparatus, and fixation is established and is continued, after the fracture has been properly reduced. (4) Comminuted fractures, fractures into articular surface of radius, fractures with damage to radio-ulnar joint and allied ligaments and angular fractures of radius should be pinned after reduction.

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Medical Service in Industry

—Revised Manual Published by American College of Surgeons—

THE American College of Surgeons has just published a revised edition of "Medical Service in Industry and Workmen's Compensation Laws" prepared by DR. GAYLORD R. HESS. The first edition of this manual was prepared by DR. M. N. NEWQUIST and published in 1934. The present edition treats certain topics in greater detail, although the fundamental principles originally prescribed for Medical Service in Industry remain essentially unaltered. Several distinctly new features are embodied in the current volume as follows: (1) Floor plans of industrial medical departments which are actually in use. (2) New tables showing the types of rooms and the number of physicians and registered nurses found in a study of 1,546 dispensaries in industry, and a table showing various items of equipment found in recent surveys of 200 industrial dispensaries. (3) Discussion of job requirements analysis, with suggestions for practical application to the proper placement of workers. (4) Discussion of nutrition with suggestions as to how a program of education may be carried out in industry. (5) A separate section entitled "A Comparative Study of Medical Services in Industry," based on early and more recent surveys, illustrated by tables and accompanied by comments, with a concluding summary concerning the subject. (6) Discussion of women in industry. Industry's call to women and the response which they made was particularly noteworthy during the years of World War II. (7) A section which contains a detailed outline of the essential requirements for an adequate medical service in industry, enumerating the principal defects most frequently encountered in the survey of industrial medical services. (8) The principal features of the various workmen's compensation laws, brought up to date as far as possible. (9) A section entitled "Employment of the Physically Handicapped." Owing to the man power situation during the second World War, it had become necessary to utilize every individual to the best of his ability. (10) A section which deals with the present Federal Social Security Act relative to its essential provisions in reference to old-age and unemployment benefits.

The new publication gives an outline of the purpose and development of industrial medicine, the organization of industrial medical service, the functions of such a service, medical and surgical service for a small industrial establishment, evaluation of medical service in industry and its costs, history and essential features of the workmen's compensation laws and insurance systems, and essential features of the Federal Social Security Act. The formulation of a minimum standard for medical service in industry and its practical application beginning in 1931 by the American College of Surgeons is described. Up to December 31, 1945, a total of 1,941 industrial establishments representing over 5,500,000 employees had been surveyed by the College, of which 1,137, or 59%, have been fully or provisionally approved. DR. HESS is an Administrative Assistant at the American College of Surgeons in the department of Medical Service in Industry.

This manual should be of great value to all those, especially in the smaller industrial situations, who are interested in setting up new medical departments or improving established services in industrial groups. Copies of the manual may be obtained at 50 cents each by writing the American College of Surgeons, 40 East Erie Street, Chicago.

The Fallacy of the Term "Varicose Ulcer"

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THE author stressed in several papers that most leg ulcers are caused by pathological conditions in the deep veins of the legs and are not due to varicose veins. Varicose veins are of two types: primary varicose veins which develop spontaneously, and secondary varicose veins which develop after venous obstruction and distal to some lesion which produces it.

Bauer stated recently in *J.A.M.A.*: "These lesions (leg ulcers), which up to the present always have been thought due to varices, were instead caused, in our material, in 80 to 90% of the patients by an earlier deep thrombosis. The generally used name, varicose ulcer, ought therefore, by rights, to be changed to post-thrombotic ulcer."

In my opinion it is more correct to call these ulcers phlebitic ulcers, because they are caused in the last analysis of phlebitis or thrombophlebitis of the deep veins and because inflammation of the vein is the basis for thrombosis. Besides, the deep veins of the leg are always sensitive to pressure in the presence of phlebitic leg ulcers. This tenderness indicates also inflammation of the deep veins.

There is a trend toward differentiate between thrombophlebitis and phlebothrombosis. In both conditions we find an inflammation of the deep veins. Many authors doubt that a thrombus may develop without previous inflammatory changes in the wall of the vein. But there is general agreement that a secondary phlebitis will develop as a reaction to a thrombus. Thus phlebothrombosis exists as such only for a short time and then the condition actually becomes a thrombophlebitis. Consequently it is justified from a pathogenetic viewpoint to call leg ulcers due to pathological conditions in the deep veins phlebitic ulcers. Fournier introduced the term phlebitic ulcer in 1892 in a lecture before the Paris Dermatologic Society. His pupil, Dabasse published in 1900 a monograph on "les ulcères d'origine phlébitique."

The varicosities found on the legs in phlebitis are collateral (detour) veins in nature. Their purpose is to act as compensatory veins for the dysfunctioning deep veins. We see these varicosities often develop after infectious diseases, such as typhoid fever, chronic rheumatism, scarlet fever, and influenza. Zesas has stressed the enlargement of superficial veins after infectious diseases. I have called attention to the infection of the deep veins in rheumatic diseases. Chiari described in his book on the pathology of rheumatic diseases "endophlebitis rheumatica." In inflammations of the deep veins the endothelium becomes considerably swollen. The result is a narrowing of the vein canal (phlebostenosis) which interferes with the return of the venous blood. Ceelen, in a pathologic report, calls this type of phlebitis "phlebitis productiva angustans," in order to express the angustation (narrowing) of the lumen.

The ensuing venous congestion in the tissue distal to the venous obstruction causes increased intravenous pressure and swelling by increased transudation and delayed reabsorption. The increased pressure in the congested tissue compresses the small arteries which bring oxygen to the cells. The lack of oxygen supply (stagnant anoxia) and the pressure of the transudate on the tissue cause first malnutrition of the affected cells and later their necrosis. The local necrosis cannot heal as long as the causative venous congestion persists and therefore develops into an ulcer.

Since venous congestion is the cause of phlebitic leg ulcers, the logical treatment is decongestion of the leg. The simplest way to accomplish venous decongestion is the application of pressure bandages and ambulation. Since the muscular contractions in the leg which squeeze the blood out of the veins is the most important factor in the venous return, it is obvious that walking forms an essential part of the treatment. The application of pressure bandages promotes the return of the venous blood considerably during walking. The effect of pressure bandages on the venous return can be demonstrated very convincingly during bloodletting from the antecubital veins of the arm. The patient is told to open and close the fist in order to produce contractions of the forearm muscles. The pressure of the forearm muscles on the underlying veins accelerates the flow of the venous blood to the bloodletting needle. Application of a snug, elastic bandage around the forearm muscles before bloodletting increases the flow of the venous blood to the needle considerably, because no pressure energy is lost into the empty space. Application of a pressure bandage around contracting muscles concentrates all pressure energy of the muscular contraction in such a manner that no pressure energy is lost into the empty space. It is important that the pressure bandage adapt itself to the body contour and be molded snugly.

The ambulatory treatment of phlebitis was described by H. Fischer in 1910. When I met Fischer in Wiesbaden about 20 years ago to learn his method, I asked him how he developed his revolutionary treatment for phlebitis. Fischer had observed that inflamed superficial veins in the neighborhood of leg ulcers healed promptly under the treatment with pressure bandages. He reached the conclusion that, if the inflammation of the superficial veins reacted so favorably to ambulatory treatment with pressure bandages, it would be logical to treat phlebitis of the deep veins with the same method. He reasoned that even in thrombophlebitis his method could be used, as the pressure bandage would imprison the thrombus and would so prevent embolism. He and his son reported on the treatment of 4,400 cases of phlebitis without a single embolism. He believed that most blood clots causing embolism are formed in the legs.

Recent pathological reports by Roessle and Castleman prove that 95% of blood clots causing embolism can be traced to the deep veins of the calf and the plantar veins. Ochsner believes that venous stasis is responsible for the blood clot formation in the lower extremities.

It is true that sometimes postmortem examinations do not disclose visible changes of the vessel wall. One must not lose sight of the fact that inflammatory changes of an allergic nature rapidly disappear after death and leave no trace of their existence. The allergic phase of phlebitis and thrombophlebitis in the peripheral veins was stressed by Meyer in several papers, especially in connection with oral focal infections and the subsequent infection of the jugular veins. Ochsner states: "It is desirable that foci of infection be eliminated since they too predispose to intravenous clotting."

DIAGNOSIS OF LATENT PHLEBITIS: The simplest way to diagnose phlebitis in the presence of leg ulcers is to palpate the deep calf veins and plantar veins by deep pressure. The muscles have to be relaxed during this examination. Inflamed veins are very tender to pressure, while normal veins (e.g., dorsal hand veins) do not hurt on pressure.

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Instructed by Experience

SHORTLY after the November landslide, a re-elected Congressman was quoted to the effect that one significant cause of the heavy protest vote was the pressure of too many so-called "experts" in administrative positions. There *were* too many; every bureau and agency teemed with them. Some idea of their number may be gathered from the fact that 234 agencies were handling only 12 governmental functions. This surfeit of agencies bred swarms of pundits; newspapers, broadcasts and magazines seethed with their pronouncements; some of them even wrote books. "Planning," rather than governing, was the business of Washington. There and elsewhere "experting" became so fashionable that the professors got into it, burgeoning profundity, and making oracles of their ivory towers. Long before the election, however, there were signs that the "experting" was getting top-heavy; that it was beginning to suffer from "its own too much." Thus the famous forecast from "a high source" regarding postwar unemployment, was undone by events; the "statistical" pontification that wages could be raised without raising prices was shown up as a pious hoax; the "need" for general price control was exploded in a month; the goal of "60,000,000 jobs," unattainable except by government planning, was reached in stride through ordinary industrial processes; and—of primary interest here—the "experts" who were attempting to foist "government medicine" on an uninformed public were openly denuded of their claims and exposed as an opinionated and self-seeking crew. Meanwhile it was beginning to be asked: "How does an expert get that way?" According to the dictionary, an expert is "one instructed by experience." This definition, however, had been abandoned; the substitute essentials seemed little more than a title and a loud voice. In many instances only the title was required—as in the cases of the doctors appointed "psychiatric officers" at Army hospitals and blossoming forth next day with a complete knowledge of psychiatry. . . . At the present time there are a good many titles and some loud voices "experting" in industrial medicine. Some are of the medical profession. Industry is being urged to listen to them. Industry has long been damned because it asks of applicants for employment "What experience have you had?" Such a question is reasonable—industry is built on experience. Possibly if more "experts" could answer that they are and have been *instructed by experience* IN *industrial medicine,* there would sooner be more medical programs in small plants.

The patient complains usually about more pain while standing, and less pain when walking. Meyer described in 1935 the other symptoms, especially general fatigue, cramps in the leg, and "rheumatic" pains in the leg in his paper on the syndrome of latent phlebitis. Tucker stated recently that latent phlebitis is very common. In spite of this fact there is very little literature on this subject.

TREATMENT OF PHLEBITIC LEG ULCERS: After spreading a bland ointment (e.g., cod liver ointment) over the area of the irritated skin and over the ulcer, the ointment is covered with gauze.

I have used for many years with excellent results the combination pressure bandage which consists of the moist, viscous, antiphlogistic Contura bandage, and the elastic, adhesive, three inches wide Pressoplast bandage. The moist Contura bandage is applied loosely, while the elastic, adhesive Pressoplast bandage is applied with firm, even, but non-constricting pressure from the toes up to the knee. The tension of the bandage must be considerable. The main principle of this treatment is pressure. Wright states that the strapping had little effect in leg ulcers until he added considerable compression. "Then," he says, "the results were absolutely miraculous." Day reported recently on his excellent results with the combination pressure bandage in the treatment of phlebitic eczema and phlebitic ulcers.

The object of the pressure bandage treatment is to decongest the affected leg. The result is removal of the pressure in the tissue spaces and of the stagnant anoxia. The accumulation of CO_2 and metabolites which choked the tissues is terminated promptly. The inflow of oxygenated blood, which was prevented by the pressure in the congested tissue is made possible, and effects healing of the ulcerations.

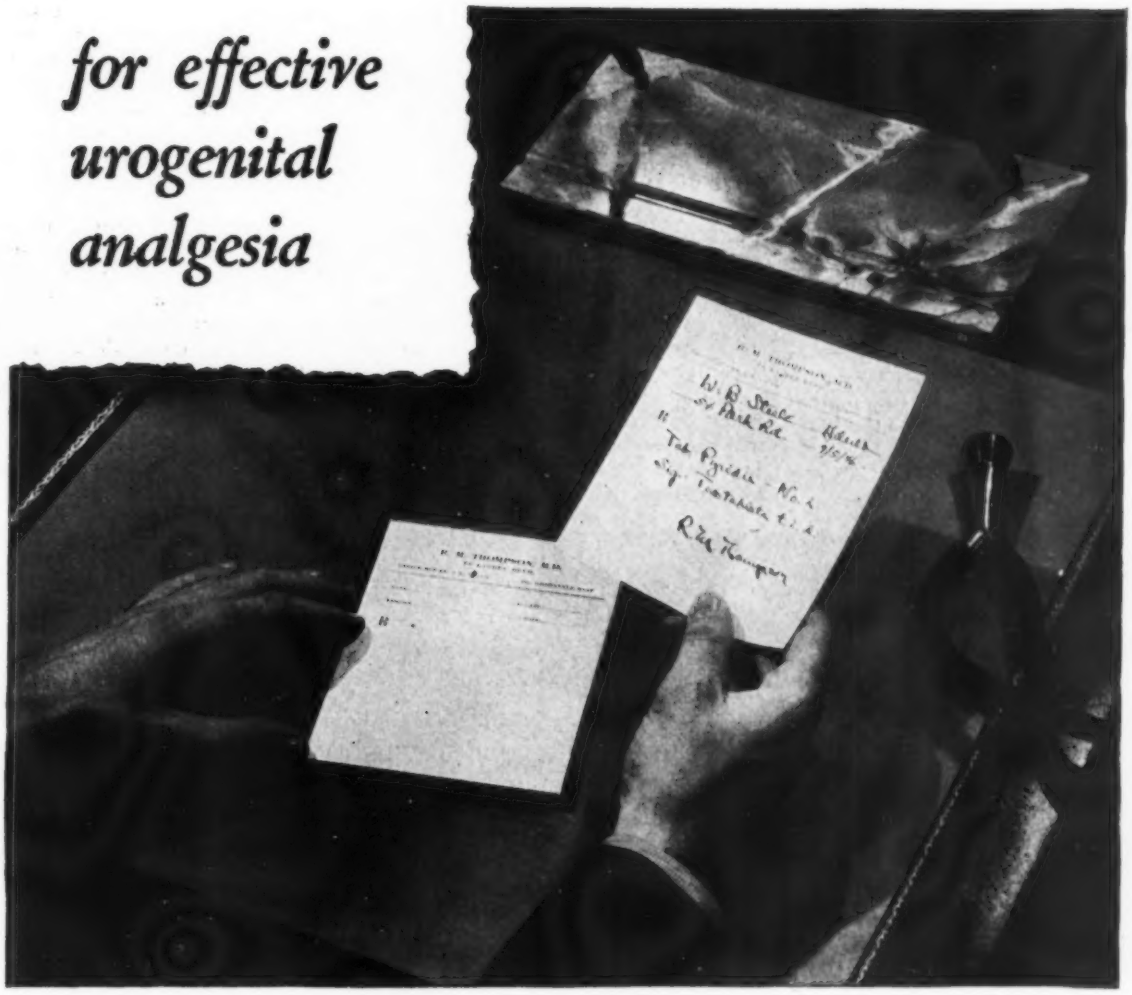
A loose-fitting bandage has no effect. Therefore, the bandage has to be changed as soon as it becomes loose.

The treatment has to be continued until the deep veins are no more sensitive to pressure.

After the deep veins have been cured, the removal of the superficial veins can be accomplished easily by obliterating injections.

SUMMARY: Most leg ulcers are not caused by varicose veins, but by inflammation of the deep veins. The varicose (detour) veins are often a symptom of phlebitic leg ulcer. Therefore, the term "varicose ulcer" for ulcers which are due to pathologic conditions in the deep veins of the leg is misleading and should be replaced by the term "phlebitic ulcer." The logical treatment for phlebitic ulcers is to cure the inflamed deep veins. The simplest is with pressure bandages.

for effective urogenital analgesia



Following oral administration, Pyridium produces a definite analgesic effect on the urogenital mucosa. This action contributes to the prompt and effective relief that is so gratifying to patients suffering with distressing urinary symptoms.

Acting directly on the mucosa of the urogenital tract, this important effect of Pyridium is entirely local. It is not associated with or due to systemic sedation or narcotic action.

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INDUSTRIAL HEALTH and DISEASE

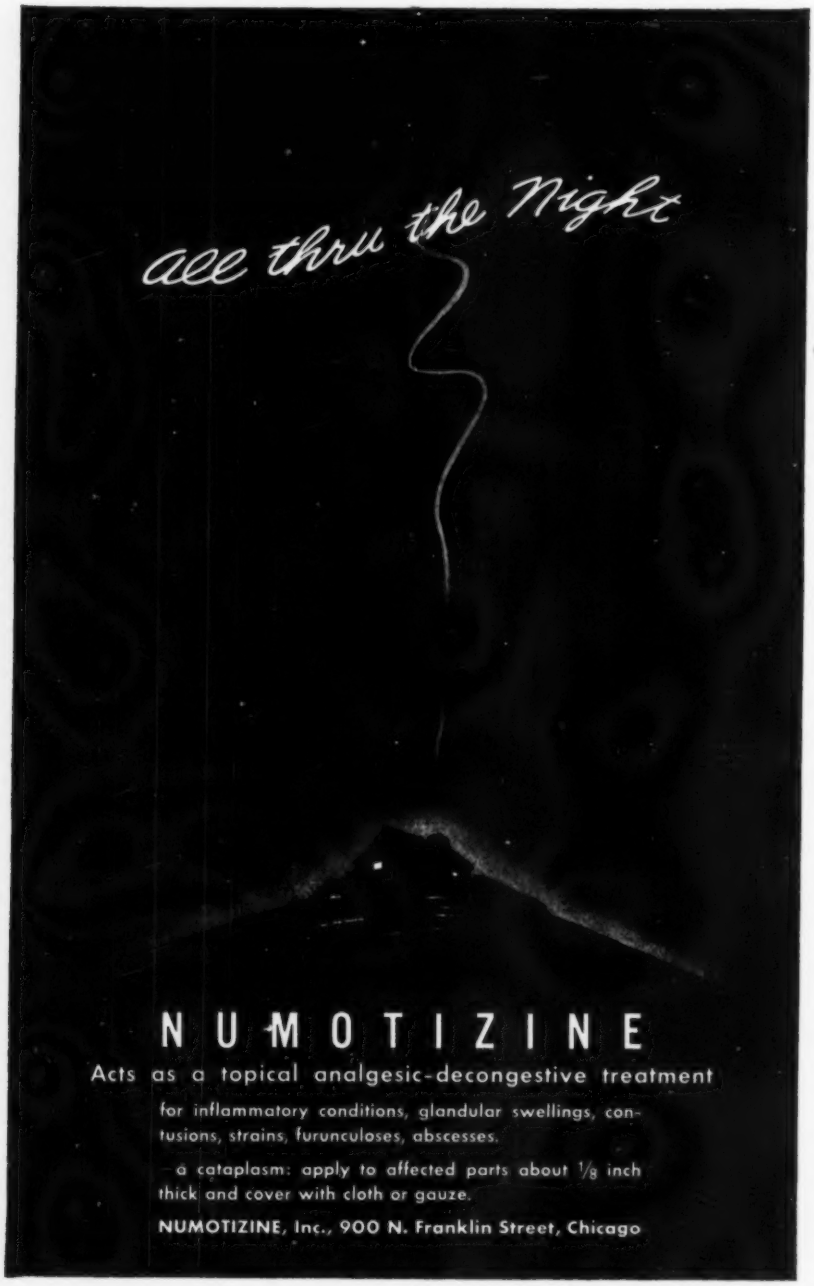
Common Eye Injuries

THE common injuries that happen in an industrial plant are as follows:

1. *Foreign bodies in the eye.* These may vary all the way from dust to a piece of steel in the globe. The first aid nurse should be instructed to put a drop or two of local anesthetic into the eye, wait five to ten minutes, and then attempt to take the particle out with a flake of cotton, or lightly brush it with a piece of cotton carefully wound on a toothpick. If it doesn't come easily by these simple means, send the patient to the eye surgeon. If it is loose in the conjunctiva of the lids, gentle flushing with the eye douche may release it. In any event, always turn the upper lids to be sure that no foreign body is concealed behind them.

2. *Abrasions of the cornea.* Large ones are self-revealing. But abrasions may be so small that they are difficult to find. First anesthetize the eye, then put in a drop or two of the fluorescein solution, and wash out with the irrigator. This red-yellow solution turns an abrasion green thus showing it in sharp contrast to the uninjured cornea. Fluorescein has been a great help to the industrial eye surgeon. When the abrasion is found and no foreign body is present, put in a soothing eye ointment and place a patch or dressing on the eye. If the abrasion is serious, send the injured one to an eye doctor. Atropine may be required.

From "The Eyes of Industry," by LEONARD W. JONES, M.D.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3. *Chemical burns of the eye.* Theoretically one should neutralize an acid burn with a weak solution of sodium bicarbonate, and an alkali burn with weak vinegar. Don't waste time hunting for these articles, for the very best treatment is to use clean water; a bucketful from the nearest tap will do. If water is safe enough for drinking, it is safe enough to put into the eye. Don't waste time with the hand atomizer. Get the man to put his head into the bucket and open his eyes under the water, or do the same in a basin of cold water, or have him lie down on a bed or operating chair and flush his eye out generously, using large pads of absorbent cotton or clean linen as sponges. Do this, and do it often. If there is much pain, atropine is indicated, and, at any rate, some soothing ointment. The best, perhaps, for burns of any kind is butesyn picrate, but holocaine, vitamin A, or boric acid ointments, will do.

As chemical burns are fraught with danger to the vision, a burned employee should be sent to the nearest eye doctor as soon as first aid has been administered. Damage to vision may come from two sources. First, the replacement of clear cornea by more or less opaque scar tissue and, secondly, adhesions of the lid conjunctiva to the conjunctiva of the globe.

4. *Contusions of the globe by large objects.* These do not happen so very often because anything greater than two inches in diameter usually expends its force against the nose, the eyebrow, or the prominence of the lower orbit. The eye is wonderfully guarded against blows of this character. Usually eyes hit by large objects look worse than they are, while eyes directly hit by a penetrating piece of steel, and in a dangerous condition, look very innocent.

A blow on the eye by a large object generally causes tremendous swelling of the lids, hemorrhage under the skin and under the conjunctiva, and, as time passes, the color changes to what is known as a "black eye." Fortunately, the chief trouble that such eyes occasion is that they provoke embarrassing questions from the victim's business and social associates.

However, every now and then the large object, or a corner of it, gets through nature's defenses and lodges a direct hit. When it does, anything can happen. There may be a ruptured globe, hemorrhage into the anterior chamber, dislocation, or even hernia of the lens, prolapse of the iris, prolapse of the vitreous, rupture of the choroid and retina, or detachment of the retina.

First aid to an injured eye of this character would mean simple cleansing of it with any weak antiseptic solution, from boracic acid to bichloride of mercury, or even plain water, the application of ice or ice compresses, a dressing and bandage, and a reference to the proper surgeon.

5. *Penetrating wounds of the globe.* These are the most dangerous of eye

welcomes

cough

control

Practically every home has played host to the influenza virus whose current invasion has blanketed the nation and crossed international boundaries. Control of the accompanying bothersome cough—dry and unproductive—is an essential part of any therapeutic regime devoted to rest and symptomatic relief.

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IN
Rheumatoid
AFFECTIONS

Local measures play an important role in the therapy of such rheumatic affections as arthritis, arthralgia, myositis, and bursitis. Through active hyperemia, reparative processes are hastened and disposal of metabolites is encouraged. Thus pain is relieved, and a sensation of local warmth adds further to the patient's comfort. Baume Bengué, through the influence of its menthol and methyl salicylate, provides the type of local therapy needed in rheumatoid affections. An appreciable amount of its salicylate is absorbed percutaneously, augmenting the influence of systemic measures.

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injuries. The particle of steel may be so small that its entry point may be difficult to find. The pain and discomfort is often so small that the employee keeps on working until he notices that something has happened to his sight. A tinsmith was hit by a small clipping of zinc at 3:00 o'clock one day. He kept on working until five when the traumatic cataract, which the particle had caused, began to blur his vision.

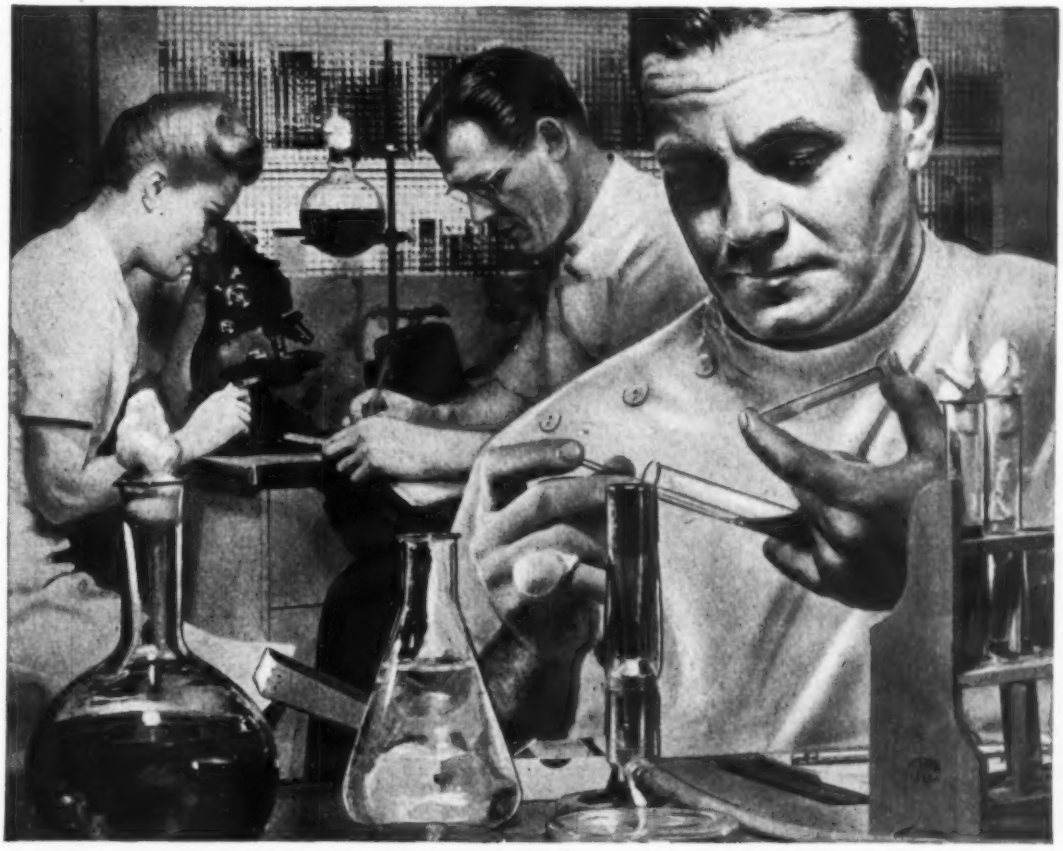
If there is a collapsed or shallow anterior chamber, an irregular pupil, marked blurring of vision, or a dull look to the pupil, suspect an intraocular foreign body, no matter how little discomfort the employee has, and send him to the eye doctor.

With the localization of a foreign body by the x-ray technique of Sweet, and, when magnetizable, the removal by the giant electric magnet, many eyes are saved and useful vision is left to the injured one. But there are still cases that go on to enucleation, or removal of the eyeball. Foreign bodies that are non-magnetizable have to be extracted by other means. The plan usually is to get an exact localization by the Sweet method. Then the eye surgeon goes into the globe by the nearest route and extracts the intruder, either by feel or by the guide of the ophthalmoscope. Glass foreign bodies are not magnetizable and they do not cast a very good shadow by the x-rays. They present a very difficult problem.

Fortunately, the eye injuries of most industrial plants are the removal of minute particles of steel and emery, slight cuts in the conjunctiva or lids, irritating small abrasions and such small fry. They can keep the eye clinic of a big plant very busy. Every now and then something turns up that makes one appreciate the importance of cleanliness and care in handling these injuries.

Cobalt

COBALT has occupied rather a minor position in commerce; but, as new and surprising uses have developed, it has become a very important metal in industry. The amount of cobalt consumed in the United States in 1944 was practically 6,000,000 pounds. Of this amount, stellite and stellite type alloys as well as carbide type alloys consumed 1,757,673 pounds. Apart from this, its chief use was for the production of "Alnico" magnets (an alloy of cobalt, nickel, and aluminum). This magnet is very powerful and capable of lifting 60 times its own weight. Cobalt is extensively used as a bonding or cementing material in the manufacture of tungsten carbide and other metal carbide tool tips and dies. These bonded carbide tools have a hardness approaching that of the diamond, and are rapidly displacing high-speed steel for cutting tools. Less important uses for cobalt are to be found in certain of its alloys, such as noncorrosive and tool steels. Other minor uses for certain non-metallic purposes are to be found in cobalt salts and driers, ground-coat frit and pigments, and in catalysts. Cobalt oxide is a very efficient catalyst for the oxidation of ammonia, and cobalt-bearing substances are in use as catalysts for the synthetic production of gasoline. A novel and, to a certain extent, recent use of cobalt is in soil dressings in areas where cobalt deficiency has produced such diseases in sheep and cattle as "bush sickness," "salt sickness," or "enzootic marasmus." The increasing exposure of industrial workers to cobalt metal dust or cobalt oxide dust—which has resulted from the rapid growth of the cemented tungsten carbide industry—has drawn attention to possible injurious action, both on the skin, and after inhalation of this finely-divided material. There is a substantial amount of experimental work on the physiological action of cobalt reported in the literature, and it would appear that the toxicity of cobalt by mouth is low. Antal (1894) found that a gram of cobalt nitrate in 1% solution had no perceptible effect on rabbits, although the same quantity in 5% solution was occasionally lethal. Chittenden and Norris (1889) also observed that the poisonous action of cobalt on rabbits is slow, and apparent only after the administration of relatively large doses. Intravenously, cobalt has been observed to cause paralysis of the extremities, enteritis and death. Le Goff (1930) found that cobalt given intravenously in man produced a marked dilation of the blood vessels of the face, with a slight fall of blood pressure. A well-recognized effect of the administration of cobalt salts to animals is polycythaemia, and most of the investigations relating to the physiological



The Doctors behind the Doctor

● Magical penicillin . . . the amazing "sulfas" . . . and now the new streptomycin . . . Thank the men of research medicine for those . . . and for all the other valuable aids they have placed in the doctor's "little black bag."

Biochemists and bacteriologists . . . pathologists and physiologists . . . whatever the field of research . . . they are, first and foremost, *doctors!* And, like all doctors, they are tirelessly devoting their lives to the cause of human health and happiness.

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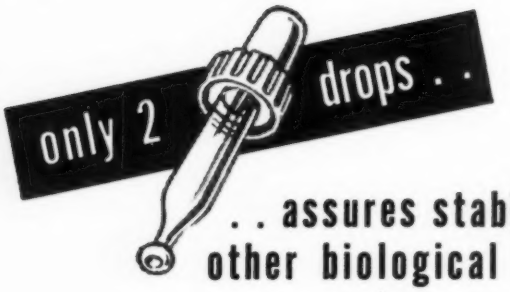

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activity of cobalt have revolved around this phenomenon. Orten (1936) concluded that the hematopoietic activity of cobalt is the result of an increase in rate of formation of haemoglobin and erythrocytes, rather than of a passive accumulation of red cells resulting from a diminished rate of cell destruction. Frequent reference has been made to the work of Barron and Barron (1936), who state that small amounts of cobalt inhibit the respiration in vitro of various tissues — notably reticulocytes and bone marrow. However, in recent experiments Warren, et al., have been unable to confirm this finding. Frost, et al., found hematopoietic response at a minimum level of .1 mg. per kg. of body weight per day when cobalt was added to iron and copper in the diet. It has been stated recently by Griffith and others that cysteine has a detoxifying action in cobalt poisoning. According to these investigators, poisoning from cobalt may be due to fixation and loss of sulphydryl compounds in tissues, with resulting interference with oxidative mechanisms. Cobalt has been shown to produce polycythemia *in rats* (Griffith et al., 1942; Orten et al., 1932; de Savitsch et al., 1936; Josland and McNaught, 1938; Anderson et al., 1940; Dorrance et al., 1943), in *rabbits* (Barron and Barron, 1936; Kleinberg et al., 1939), *in ducks* (Davis et al., 1945) and *in dogs* (Frost et al., 1941; Brewer, 1940; Davis, 1940; Frost et al., 1941). Kent and McCance found that in man the gastro-intestinal tract is the main channel of excretion for the cobalt naturally occurring in food, and that, intravenously injected, cobalt is chiefly eliminated through the kidneys. The process of elimination of cobalt from the tissues of man is very slow. In the rat cobalt is excreted chiefly in the urine, and, according to Copp and Greenberg, most of the ingested cobalt is quickly eliminated. Using radioactive cobalt, these investigators found that the amounts distributed in tissues are very small, while the bones—and the glandular organs, such as the pancreas, liver, and spleen — retain the larger amounts. In an investigation made in the tungsten-carbide industry, Schwartz and his associates have shown that powdered cobalt produces dermatitis. Stewart has shown that in a patient sensitive to both cobalt and nickel, hyperemic edematous vesicular lesions were produced by cobalt, and that the sensitivity was somewhat less than to nickel. Haxthausen has experimentally demonstrated a hypersensitivity of the skin to cobalt, while Rabeau and Ukrainczyk have been unable to confirm the reciprocal hypersensitivity of nickel-sensitive subjects to cobalt and vice versa.

—From "Recent Advances in Toxicology," by LAWRENCE T. FAIRHALL, in *Industrial Hygiene Newsletter*, October, 1946.

Union Health Center

THE efficient administration of the Union Health Center is considerably hampered by a number of factors, of which perhaps the most conspicuous are broken appointments, forgotten medical certificates, and requests for refunds. Let us examine each of these difficulties and explain why they create so much trouble. A broken appointment causes confusion and uncertainty among the members of the staff. They have prepared the necessary medication for the patient's tests; the physician, nurse or laboratory technician is there, ready to serve and waiting for the patient. But no patient arrives. All the work which has been done to care properly for that patient has gone to waste. While we are naturally concerned with the financial aspect of such a situation, it is the human element which is of major importance. For example, if we could have known 48 hours in advance that one patient would not keep his appointment we could have taken care of another patient whose appointment was postponed for a later date. Presumably the former did not think it important to notify the Union Health Center that the appointment was not going to be kept; hence the waste of time and effort and—what is more significant—someone else lost an earlier appointment. This, then, is the reason why we ask for a deposit on all x-ray and laboratory tests. Although this has helped to a considerable extent, it has not eliminated the habit of breaking ap-

JUST A FEW DROPS

HELP PROTECT HARD-WORKING HANDS

Grease, grime, dust and dirt are hard on workers' hands, and if not removed may become embedded in the skin and cause irritation. Scouring powders, too much soap or harsh solutions are hard on hands too, and may dry out the skin, causing tiny fissures through which harmful bacteria may gain entrance and cause infection.

TRUSHAY, the "Beforehand" Lotion guards against depletion of the skin's natural lubricant . . . aids in keeping the dermal tissue normal and unbroken.

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Men as well as women enjoy using this fragrant, creamy hand lotion. Why not keep a supply of TRUSHAY in the dispensary and encourage its regular use by workers in your plant?

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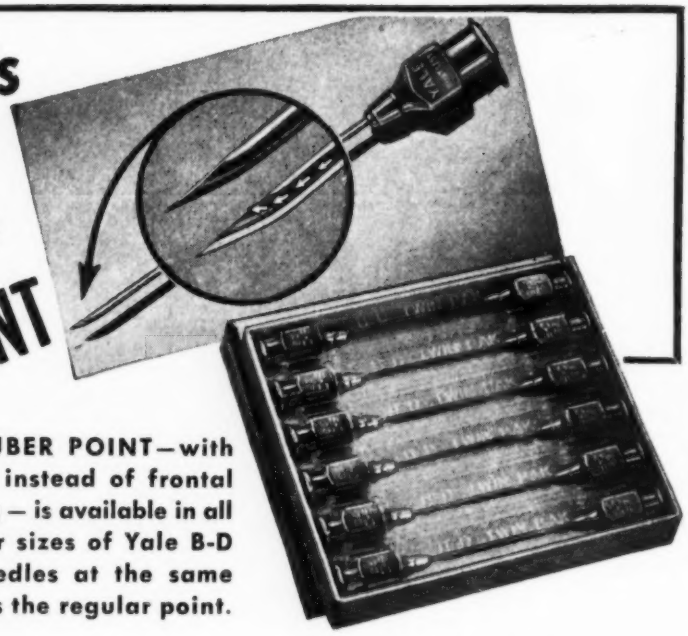

The HUBER POINT—with lateral instead of frontal opening — is available in all popular sizes of Yale B-D Lok-Needles at the same price as the regular point.

During the past year many physicians have used Yale B-D Lok-Needles — with HUBER POINT.

Having satisfied themselves as to the advantages of a hypodermic needle point with lateral instead of frontal opening, they now specify HUBER — as the point they prefer.

A glance at the design of the Huber Point discloses why it reduces pain, trauma and seepage.

The lateral bore-opening is out of the path of penetration. It is not in position materially to catch tissue or punch out tissue plugs.

The sharp point, followed by the smooth closed bevel, minimizes tissue disturbance and pain. It simply slits skin and tissue, the elasticity of which helps to control seepage.

Securely packaged on the plastic Twin-Pak container, Yale B-D Lok-Needles with Huber Point are easy to purchase and handle in quantities of from two to a dozen. Each plastic section insures protection of the points in transit or storage.

Yale B-D Lok-Needles, regular or Huber point, lock on Yale B-D Lok-Syringes.

Specify Huber Point if you wish to receive it.

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pointments. Moreover, the very patients who have failed to keep their appointments often come and demand that their deposits be returned. Formerly they got them. But with the shortage of space and personnel to handle additional—and unnecessary—work, we have been forced to come to a decision on this matter. Henceforth, unless the Union Health Center is notified 48 hours beforehand that an appointment is cancelled, the deposit will not be returned. Patients appearing at the Union Health Center are asked to bring their medical certificates with them every time they visit the Center. Should they forget to bring their certificates, they will have to pay cash for the service. All information to the contrary notwithstanding, the cash payment will not be refunded even if the patient brings the medical certificate at some later date. No refunds will be given on cash payments made for failure to bring medical certificates. Even if the Union Health Center wished to make such refunds, it is not equipped to do so at this time. In order to make these refunds we would require a full-time refund department—a step that we can not take under existing circumstances. Medical certificates are valid for the whole year. In most cases, the patient suffers no loss in making the cash payment, especially if during the course of the year he requires more medical service than is covered by his certificates. We urge members to cooperate in observing the rules of the Union Health Center by bringing their certificates at each visit, by making cash payments and by not requesting refunds.

—PAULINE M. NEWMAN, in *Jersey City Justice*, October 1, 1948.

BOOKS

Toxicology

INDUSTRIAL TOXICOLOGY. By ALICE HAMILTON, A.M., M.D., and RUTHERFORD T. JOHNSTONE, M.D., Director of Department of Occupational Diseases, Golden State Hospital, California. Edited by Henry A. Christian, A.M., M.D., LL.D., (Reprinted from Oxford Loose-Leaf Medicine with the same page numbers as in that work.) Cloth. Price $2.50. Pp. 597-663; (69). New York: Oxfrd University Press, 1945.

THIS small volume, coming from two able and experienced workers in the field, is most timely because of the great interest at present in industrial toxicology. The book is divided into three parts, devoted to (1) pathology and diagnosis, (2) treatment and prevention and (3) an extensive bibliography. The subject matter is concisely presented and covers the ordinary material encountered in a great variety of industrial pursuits. Some of the newer developments, mostly restricted information, are not contained in this volume; in subsequent editions, when the material is reclassified, it will no doubt be mentioned. The book should receive wide acceptance because in several institutions there is contemplated the establishment of either a department of industrial toxicology or a more comprehensive program in which industrial toxicology will form a division. Several of the industrial firms are also contemplating extensive developments, so that they will be able to examine new compounds for the possible toxicologic action and in this way anticipate possible trouble rather than to repair the danger after it is done. The authors and publishers should consider putting the volume out in a somewhat enlarged form and also some improvement in pagination. In its present form the book is readable and has the essential facts of toxicology succinctly presented.

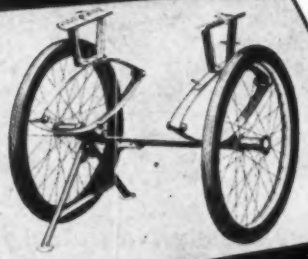
—Book Notice, in *J.A.M.A.*, August 3, 1946.

Textbook

NURSING IN COMMERCE AND INDUSTRY. By BETHEL J. MCGRATH, R.N. Prepared for the National Organization for Public Health Nursing. The Commonwealth Fund, New York, 1946; 307 pages, appendix and index, price $3.00.

INDUSTRIAL nurses are rightly impressed with their very considerable contributions to employee health and welfare. They have complained with justification that guidance of the right sort is all too frequently denied them. This book goes a long way toward supplying that guidance. It is one of the better works in the whole field of industrial health. It can be confirmed at once that the range of subject matter includes everything, or nearly so, that the industrial nurse is likely to

Write to or visit your nearest WAA Regional Office for brochure which gives complete information on items like those pictured and others:



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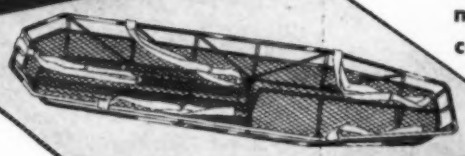

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LITTER, folding aluminum. Unused.

	PRICE
Priority Claimants	$4.00
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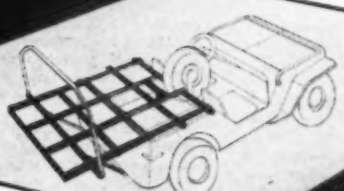
Small Retailers	4.80
Large Retailers	4.60



LITTER CARRIER, for attachment to ambulance or truck. Complete with brackets and all attachments. Steel. Unused.

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Here's an opportunity for hospitals, schools, universities and municipal enterprises to purchase unused litters and litter carriers at far less than usual prices. Commercial distributors will find ready merchandising outlets in industrial health units, ambulance service companies, medical offices and public service concerns.

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Orders should be placed with your nearest Regional Office. Orders will be accumulated up to 5 p. m. on December 30, 1946, and will then be filled in the following sequence: (1) Certified Veterans of World War II; (2) RFC for small business; (3) State and local governments; (4) Non-profit institutions; (5) Non-priority buyers. Orders received *after* this date from veterans, other priority and also non-priority purchasers will be filled from remaining inventories without regard to priorities. Federal Agencies have already been given an opportunity to fulfill their requirements.

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Veterans of World War II should apply to their nearest War Assets Administration Certifying Office for certification and should then send orders to the nearest War Assets Administration Regional Office. The case number and date shown on the certification and the location of the certifying office must be stated in a veteran's offer to purchase.

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need in her daily work. In addition to the text, reference material and sources of additional dependable data are listed at each chapter's end. There is a useful appendix. Certain chapters have been prepared by special contributors. Quite obviously this publication is written by one who has had a long and intimate association with industry and who understands the quirks and foibles that go to make up the fascinating subject of human relations. This book should be most helpful in stabilizing the professional outlook of the nurse in industry and in diverting to this field its rightful share of progressive, intelligent nursing leadership.

—CARL M. PETERSON, M.D., in *J. Indust. Hyg. & Toxicol.*, July, 1946.

COMMENT and OPINION

On the Wane

SILICOSIS, once a great hazard to the health of industrial workers, is no longer a threat. In one research project involving 28 plants, having operations using millions of tons of dangerous silica, only three plants were found to have silicosis hazards, and these hazards were readily overcome. This triumph of scientific research to protect workers' health was announced by DR. F. R. HOLDEN, W. C. L. HEMEON and T. F. HATCH, of the Industrial Hygiene Foundation, at a recent meeting. "The dangerous trades of our fathers have all but disappeared," they reported. Potentially poisonous dusts, fumes and gases can and are being used every day in modern industry without danger. "Dust control continues to occupy the major place in the entire array of industrial health problems with which we are concerned. It is necessary to distinguish between the silicosis dust problem in industry and the far more common nuisance dust problem. Not infrequently we find nuisance dust exposures to be more injurious to the mechanical equipment than to workmen. Good progress has been made in research directed toward more exact measurement and identification of different kinds of dust."

—*New York World-Telegram*, November 9, 1946.

"Probability, Where Is Thy Sting?"

WAR Department Educational Manual EM 758, Life Insurance: "The fact is, that in the first half of the normal range of life, death is only a chance and, so far as any given year is concerned, a very small one. The odds are greatly against it. But if it does not occur in the first half, the probability that death will occur in the latter half of life becomes a certainty, and . . ."

—*Industrial Hygiene Newsletter*, October, 1946.

Treatment by Blueprint

IF ENACTED into law, the Wagner-Murray-Dingell bill, it is estimated, would give the 'national planners' an additional 1,000,000 'pay roll puppets,' and three billion dollars a year from enforced pay roll contributions to spend as they please at the outset. These are the normal developments of burocracy, in whatever field. Unleash them upon the profession of medicine and we shall soon have official diagrams from Washington telling exactly how to apply a splint to a broken leg, and every other method henceforth will be criminal malpractice, just as it was a criminal offense for a butcher to cut a steer in any way except that prescribed in the official OPA blueprint."

—ERNEST E. IRONS, M.D., "Socialized Medicine from a Historical Point of View."

Union Men Will Lose

DR. LAWRENCE T. BROWN, of Denver, writing in the *Rocky Mountain Medical Journal*, expresses the opinion that organized labor seems to have reversed its philosophy in declaring support of the Wagner-Murray-Dingell legislation. DR. BROWN says: "There are several widely known experiences of labor which go to prove that this official stand is against the best interests f the individual working man. The main effort of unions has always been in the direction of greater economic freedom for its members. It is, therefore, entirely inconsistent for labor now to advocate a scheme which puts shackles on medicine. Incidentally, thousands upon thousands of workmen now receive medical care free from a company doctor hired for that purpose. This scheme will compel those workmen to pay for what they now get free. Many unions hire a man whose job it is to investigate

"Total" Therapy

FOR INDUSTRIAL DERMATITIS

"The therapy of a majority of the cases of contact dermatitis encountered in industry", according to the noted dermatologist, Dr. Frank C. Combes[1], "requires no further medication than the intelligent use of a *good buffer solution such as Liquor Aluminum Acetate (Burow's solution)* . . . and a *good crude coal-tar paste.*"

His preference for wet dressings solution is **Domeboro Tabs** ("widely used in industry", particularly by Parkes[2] at Curtiss Wright for cutting-oil dermatitis)—because it is "a convenient tablet which, when dissolved in water, releases a *lead-free aluminum acetate in appropriate dilution,*" with a substantial percentage of boric acid.

The *crude coal-tar paste* used at New York University, according to Combes, "is manufactured commercially under the name **Daxalan**"—which has been found *superior to distillates, filtrates and pastes containing liquor picis carbonis.*

It must be properly applied for "optimum benefit", and Combes advises thinning with **Domolene** for spreading over a large area—because in his judgment its hydrophilic ointment base "does not materially lessen the therapeutic efficacy of the paste."

With tissue repair under way, and only erythema remaining, the use of **Domebore Ointment** (each ounce of which, in a special hydrophilic base, possesses the therapeutic action of one Domebero Tab diluted in a pint of water), permits a quicker return to work, while healing is promoted by its efficient topical action.

(1) Combes, F. C.: Indus. Med., July, 1944.
(2) Parkes, Morey: Indus. Med., January, 1944.

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Apply daily after a mild soap bath and thorough drying. A thin, invisible, economical film suffices. No bandages necessary. After a week, adjust to patient's progress.

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THE distressing dryness of sensitive, vascularized nasal mucosa—occurring during the prodromal stage of coryza, as a result of climatic conditions, or subsequent to the instillation of aqueous nasal medication—may frequently be prevented or relieved by the administration of Pineoleum Compound. Intranasal application by dropper or spray causes a protective oily film to be spread over the membranes, sealing in their natural moisture (requisite for nasal health and comfort)—and locking out microorganisms provocative of more serious respiratory complications.
• Proved thoroughly safe for normal adult use in controlled clinical experiments*, Pineoleum is gratefully received by patients. For additional tissue shrinkage, an effective—but rebound-free—dosage of ephedrine is supplied in Pineoleum with Ephedrine.
Formula: Pineoleum Compound contains camphor (0.50%), menthol (0.50%), eucalyptus oil (.56%), pine needle oil (1.00%), and cassia oil (.07%) in a liquid petrolatum base—plain or with ephedrine (0.50%).
Dosage Forms: Available in dropper bottles; with complete atomizer set; and as petrolatum jelly with ephedrine.
*Griesman, B. L.: Arch. Otolaryngology 39:124, 1944: abst. J.A.M.A. 125:173, 1944: Yearbook of Eye, Ear, Nose & Throat, 1944, p. 309. Also Novak, F. J., Jr.: Arch. Otolaryngology 38:241, 1943.
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accidents to see to it that the injured union man gets what is coming to him. This hiring is, in effect, an acknowledgment that the patient is the loser when someone else pays the doctor bill. Of all the men in any business organization, the one more certain to be distrusted by the workmen than any other is the company doctor. Why the distrust? Because, the doctor being paid by someone other than the patient, is trying to serve two masters. Unions acknowledge the existence of that factor because the latest trend is to take the doctor from the company and hire him by the employees' mutual health benefit association. This is an effort obviously designed to bring the doctors' patient obligation closer to the doctors' paymaster obligation. And yet, when labor asks for this portion of the W.M.D. bill, it is asking for a stronger, tighter noose about the workman's neck, a noose manipulated by hands further removed from union control than is the company doctor—a government doctor, paid by the government, obligated to the government as his paymaster."

—*Jackson County Medical Society Weekly Bulletin*, November 9, 1946.

Balanced Diet

THE protective value of a balanced diet may be seen from the following incident. An outbreak of illness occurred among a group of women handling an organic solvent. Those who became ill had been living on a diet high in fat and containing little protein and few minerals; those who remained unaffected had been eating a more balanced diet. Milk is said to be a particularly valuable protective agent, since it is rich in both protein and minerals, especially calcium. Experiments with animals have shown that those on a diet low in calcium are more seriously damaged by liver poisons than those on a high calcium diet. Moreover, many individuals affected by industrial chemicals have been cured by treatment with calcium and protein products. Some authorities advise that workers handling lead or other metals, chlorinated solvents, or hydrofluoric acid should be instructed to drink a quart of milk a day. Various vitamins are believed to be important protective agents against one or another of the industrial chemicals. It is therefore recommended that the diet be adequate in vitamin-rich foods, such as fresh fruits and vegetables. In some plants, specific supplements are supplied, on recommendation by the plant physician. Alcoholism greatly increases the susceptibility of the individual to chemical poisoning, and employees should be warned accordingly. Although allowance must be made for varying conditions, the most generally recommended diet for workers handling potentially harmful chemicals is one which is low in fat, high in protein and carbohydrates, and adequate in minerals and vitamins. The safety education program for personnel employed in chemical departments may well include information on proper diet as a factor in the safe use of industrial chemicals.

—Safety Research Institute.

Doctors' Occupational Disease

SOME years ago a doctor who was filling out an insurance company's certificate of death for a colleague who had died of coronary occlusion came to the question, "Was the occupation of the insured related to the cause of his death?" Impulsively he answered the question, "Yes," and explained that the practice of medicine certainly predisposes to coronary disease. This answer is vindicated by an excellent article in *Minnesota Medicine* for September, in which Dr. Newell C. Gilbert, professor of medicine at Northwestern University School of Medicine, dubs coronary heart disease "the occupational disease of doctors." Dr. Gilbert reminds us that, more than 150 years ago, Christopher William Hufeland wrote that "mortality is greater among practical physicians than perhaps among men of any other profession. They have the least opportunity of observing those prudential rules and precautions, for preserving health, which they lay down to others; and there are few employments in which the powers both of the body and mind are exposed to so much consumption as in this." As proof of his contention that coronary disease is an occupational disease of doctors, Gilbert cites H. L. Smith's statistical study of various occupations, (*J.A.M.A.*, April 17, 1947) which showed that "there were 33 instances of coronary sclerosis among the physicians, 16 among the bankers, 14 among the lawyers, 14 among the clergymen, eight among the laborers, and eight among the

farmers. The criteria for the diagnosis were the same in all the groups," and there were approximately 300 persons in each group. Gilbert points out that the sensible thing for the doctor to do is to face realistically the fact that his occupation is strenuous enough at best, and to avoid as much stress and strain as he possibly can. "The moral is plain: . . . do as you advise others to do." The final admonition should be memorized by every doctor: "As Dr. George Palmer used to advise, no one should dash through life; rather, as far as is compatible with duty, he should quietly and thoughtfully saunter through life."

—*North Carolina Med. J.*, October, 1946.

"Relatively Non-Toxic"

NO ORGANIC solvent may be considered non-toxic and to speak of a particular solvent as "relatively non-toxic" is apt to be dangerously misleading, according to the Division of Industrial Hygiene of the Illinois Department of Labor. Recently released statistics on occupational disease injury cases closed in Illinois during the year 1944 show that naphtha which is generally classed as a "relatively non-toxic" solvent was responsible for three cases of occupational disease. Only one case was caused by benzol, two by carbon tetrachloride, and two by tetrachlorethane. Amyl acetate and turpentine were responsible for one each. Carbon tetrachloride apparently caused less injury than any of the other organic solvents, the amount of compensation paid being $21.00, or an average of $11.00 for each case. The injuries were listed as "temporary," the period of disability for both injuries totaling 22 days. For the other organic solvents, the amounts of compensation awarded were: for amyl acetate, $15.00; for benzol, $3,412.00 (the case was listed as a permanent partial disability); for naphtha, $4,806.00 ($106.00 for two non-fatal cases and $4,700.00 for one fatal case); tetrachlorethane, $1,199.00 (both cases were listed as permanent partial injuries); and turpentine, $20.00. It is pointed out by the Illinois Division of Industrial Hygiene that the statistics do not necessarily represent all the cases which actually occurred, inasmuch as only those involving some permanent impairment or loss of time exceeding the statutory one-week's waiting period are included. No information is available on cases of disability terminating within the waiting period or for cases in which no claims for compensation were made with the Illinois Industrial Commission. Other considerations which should be kept in mind, the Division of Industrial Hygiene cautions, are as follows: (1) Cases of disability and death directly attributable to an industrial exposure to solvent vapors are not always so reported by the

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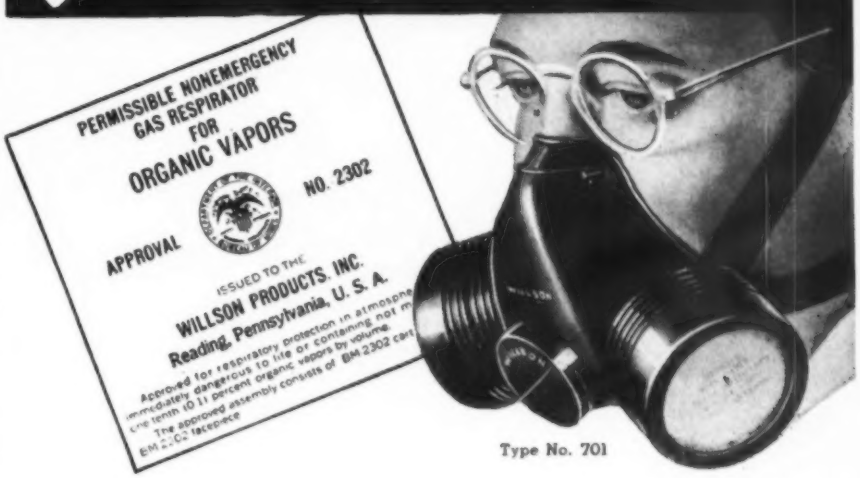

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Yes, Willson Chemical Cartridge Respirator No. 701 has received Bureau of Mines Approval No. 2302. It furnishes reliable protection for your workers, who are exposed to organic chemical vapors in *low concentrations*.

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And—as in other Willson safety products—*comfort* as well as protection features have been designed into this lightweight respirator. Your workers get better, more secure fit because of the adjustable nose spring and molded rubber facepiece. In addition, a sturdy double headband keeps the respirator tightly sealed and divides its weight for proper balance.

ENTIRE CARTRIDGE is easily replaceable as a complete unit. Double filters help to keep breathing resistance *low*.

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The confidence of physicians in the therapeutic action of HVC is evidenced by the increasing number who are daily prescribing this preparation for women who must be on their feet all day long.

HVC is antispasmodic and sedative. It relieves smooth muscle spasms and is therefore useful not only for dysmenorrhea but also as a general antispasmodic. Non toxic, non laxative.

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employer, employee or his attending physician, due primarily to ignorance or failure to coordinate industrial exposure with morbidity or death. (2) No reliable records are available as to injuries or illness caused by chronic exposures to organic solvents, although many uncontrolled exposures have been observed. (3) Many contested cases are not compensated because of legal interpretations and limitations and differences in medical opinion which are brought into play. "Organic solvents of great variety are extensively used in nearly every industry," the Division concludes. "It is becoming evident that a greater number of solvents must be classed as toxic or potentially toxic, for even such materials as naphtha produce toxic effects."

Industrial Hygiene in New York

ONE of the most vital divisions of the entire State Labor Department in its benefits to employers and all who come under the New York State Labor Laws is the Division of Industrial Hygiene and Safety Standards. This Division was reorganized in 1945 in order to consolidate under one executive director those activities formerly carried on by the Divisions of Industrial Hygiene, Codes and Engineering. Already the new administrative set-up has aided greatly in preventing occupational diseases and industrial accidents in New York State. The functions of the Division of Industrial Hygiene have always been twofold: (1) acting as technical consultant to the Labor Department—providing medical, chemical and engineering data on request to other divisions; and (2) carrying out its specific responsibilities for early detection, prevention and control of industrial health hazards. After the reorganization, two new functions have been added: (1) making the basic code rules which determine the Division's actions; (2) and examining and approving building plans for employers constructing new factories or extensions, as well as for factory ventilating systems. *Preventive Measures*—Pre-erection inspection of proposed industrial structures circumvents the introduction of emergency control measures after construction work has been completed. The action of the Division in that particular phase of industrial hygiene is a money-saving service to industry and a health-saving service to workers. In 1945, the Units of the Division visited 3,345 plants and, in addition, serviced 1,936 such plants—representing the protection of 636,132 industrial workers. The Engineering Unit recommended equipping 6,650 machines with safety devices, approved 1,738 proposed exhaust systems and disapproved 395. In one year—1945—10,959 workers were shielded from occupational diseases and accidents by the constant vigil of that Unit. *Medical Unit*—Well over 200 cases of occupational disease were investigated by the Medical Unit and 1,090 industrial plants were inspected in an effort to bring to light substandard disease prevention measures. The Unit also searched the files of 4,045 compensated industrial accident cases for clues suggesting effective accident prevention. *Chemical Unit*—In 1945, the Chemical Unit analyzed 2,072 chemical and air samples, determined the nature of 1,557 chemical substances used by industrial workers, and made 30 dust counts in dust-producing industries. Effectiveness of the ceaseless crusade waged against industrial diseases and accidents is portrayed in the ever decreasing occurrence of personal and general industrial tragedies. At all times the Division serves the State's industrial plants and their workers by detection, control and prevention of industrial health hazards and occupational diseases, and by control of the working environment.

—*New York Journal of Commerce*, November 12, 1946.

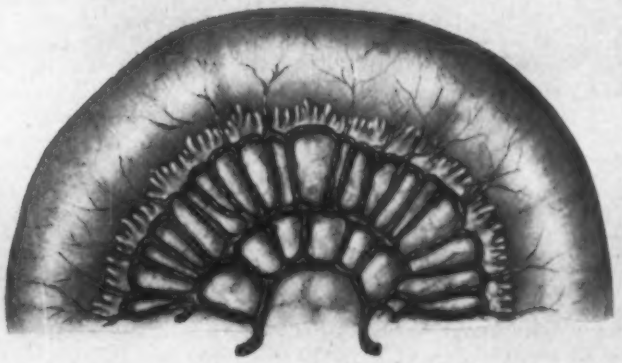
The "Nervous" Worker

TELLING a "nervous" patient to take time off from his job may be the worst advice a doctor can

Gentle Pressure of Liquid Bulk

for gentle yet thorough laxation

Schematic section of villi showing fluid exchange system through blood vessels whereby water is drawn into the bowel to help form "liquid bulk."



Macroscopic view showing how fluid exchange is facilitated by drawing of excess bulk to the intestine through the highly vascularized mesenterium.

The gentle action of SAL HEPATICA is not localized to one particular section of the canal. It is effective throughout the entire bowel, beginning at the upper end of the intestine and extending to the lower segment.

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give. If the advice is followed the patient may become a chronic mental patient, DR. FREDERICK W. DERSHIMER, director of psychiatry for E. I. duPont de Nemours & Company, warned at the meeting in Chicago of the American Psychiatric Association. Employers and the public as well as employees may suffer if workers with nervous and mental disease are too rigidly eliminated from industry.

—*Science News Letter*, 49: 360, June 8, 1946, quoted in *Digest of Treatment*, November, 1946.

Wound Management

SEVEN hundred years ago the principle that wounds should heal per primam was enunciated by Ugo of Lucca. After an hundred years, however, this heretical opinion was overridden and surgery went back to the Galenical theories of *pus laudabile* and polypharmacy, not to emerge again until the last half of the 19th century under the leadership of Baron Lister, who firmly established antisepsis and then asepsis. In 1891 William S. Halsted taught the modern principles of wound healing. Our present conceptions are based upon his teachings. The points in the surgery of the wound and its repair are sharp dissection, gentle handling of tissues, Complete hemostasis, maintenance of blood supply, avoidance of tension and strangulation of tissues, obliteration of dead spaces, the use of fine ligatures, the *excision of all devitalized or dead tissue and sloughs*, the removal of foreign bodies, and the application of a nonconstrictive dressing of even pressure. In the cleanly prepared wound bactericidal agents are not only not indicated by do harm rather than good. It is not necessary to "stimulate" healing. This will progress normally provided a wound is properly prepared, left clean, and dressed with a simple supportive dressing, and provided the patient is maintained in a normal balance as to hydration, blood picture, nutrition and vitamins.

—From "Surgical Principles in Wound Management," by COLONEL FRANK B. BERRY, AUS, *in Bulletin of the New York Academy of Medicine*, November, 1946.

Revision of Standing Orders

AS ONE of its projects for the current year, the Committee on Industrial Health, in cooperation with the Industrial Hygiene Unit of the State Board of Health is planning to revise the standing orders for nurses in industry issued by the State Medical Society a number of years ago, DR. D. E. DORCHESTER, chairman, announced recently. The basic standing orders will be revised in keeping with standards set by the American Medical Association, with supplemental material covering the special fields of surgery, internal medicine, dermatology, and EENT. For the specialty standing orders the committee will be assisted by a special committee appointed by DR. P. R. MINAHAN shortly before the Annual Meeting. The committee assisting the Committee on Industrial Health consists of DRS. THOMAS BURDON, Green Bay, O. A. SANDER, Milwaukee, and JOHN T. SPRAGUE and M. J. REUTER, Milwaukee. In order to determine the extent and nature of industrial practice in the state, the Committee on Industrial Health is conducting a survey among all members of the State Medical Society and the Wisconsin Manufacturers Association, on which the future activities of the committee will be based. It is anticipated that during the next six months the Committee on Industrial Health will conduct a series of in-plant medical clinics. The details will be announced in a later issue of the Journal.

—*The Wisconsin Medical Journal*, November, 1946.

Strange Accidents

ONE of life's little mysteries to doctors and economists came when 17-month-old Larry Lingle of Harrisburg, Pennsylvania, swallowed a nickel and coughed up a penny. This incident figures in a record of odd accidents in 1945 listed by the National Security Council. In Toledo Mrs. Margaret Cook's car blew a tire at a railroad crossing and careened down the tracks toward an approaching freight train. The auto struck a signal switch and threw a red block against the train, automatically stopping it. When a pin in her washing machine broke off, Mrs. Axel Soder, of Makinen, Minnesota, looked around the house for a substitute one and finally found something she thought was just the thing. She sawed off the end of it and started to hammer it into the machine. She might have done it too, if the substitute pin hadn't exploded and blown her clear across the room. She had selected a stick of dynamite. Taxi Driver Ethel

AT HOME OR AWAY SPOT TESTS SIMPLIFY URINALYSIS

NO TEST TUBES • NO MEASURING • NO BOILING

Diabetics welcome "Spot Tests", (ready to use dry reagents), because of the ease and simplicity in using. No test tubes, no boiling, no measuring; just a little powder, a little urine—color reaction occurs at once if sugar or acetone is present.

Galatest Acetone Test (DENCO)

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SAME SIMPLE TECHNIQUE FOR BOTH

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COLOR REACTION IMMEDIATELY

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Thantis Lozenges have proved especially effective in soothing and relieving these conditions. The effectiveness of Thantis Lozenges is due to two active ingredients:

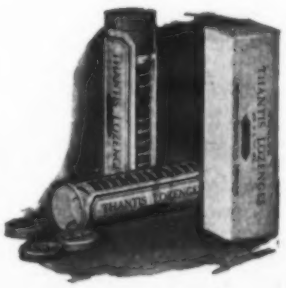
Merodicein* an antiseptic which prevents the development of bacteria even in great dilution

Saligenin† a mild local anesthetic which relieves the discomfort of throat infections.

Thantis Lozenges are antiseptic and anesthetic for the mucous membranes of the throat and mouth. Complete literature on request.

Supplied in vials of twelve lozenges each.

* Merodicein is the H. W. & D. trade name for monohydroxymercuridiiodoresorcinsulfonphthalein-sodium.
† Saligenin is orthohydroxybenzylalcohol, H. W. & D.



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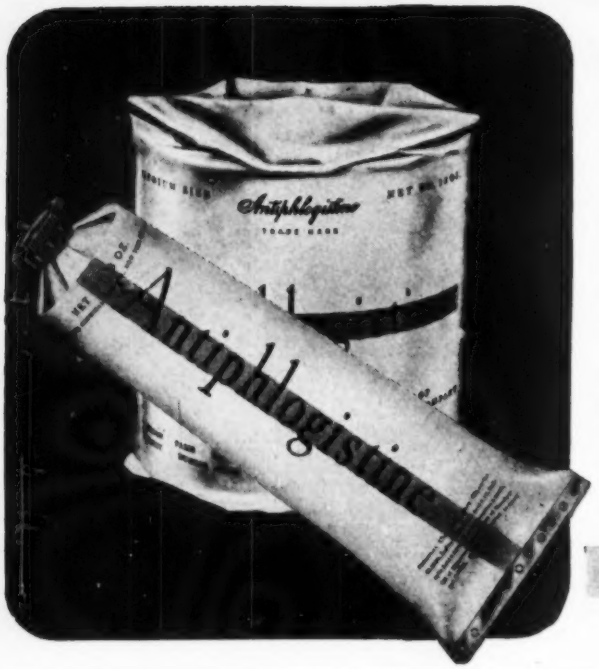

THE moist heat of an ANTIPHLOGISTINE pack is of definite value in relieving many of the troublesome symptoms accompanying affections of the respiratory tract.

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ANTIPHLOGISTINE is a ready to use Medicated Poultice—it maintains comforting moist heat for many hours.

Formula: Chemically pure Glycerine 45.000%, Iodine 0.01%, Boric Acid 0.1%, Salicylic Acid 0.02%, Oil of Wintergreen 0.002%, Oil of Peppermint 0.002%, Oil of Eucalyptus 0.002%, Kaolin Dehydrated 54.864%.

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—From *New York Times*, in Lippincott's *Digest of Treatment*, October, 1946.

DR. PILGRIM

—Continued from page 7.

pourri of fall colors; and later, participating in the panel discussions on the activities of the industrial nurse, at which MR. L. H. BURNS, who was to take the part of management, was absent and so PILGRIM took the parts of both medicine and management and there being much merriment when it became necessary each time to say for whom PILGRIM was speaking; and, later, libations with PAUL HALLEY, Industrial Hygienist of the West Virginia State Department of Health, and NURSES INGOLDSBY, SCHILLING and FERGUSON, returning to Connellsville in the rain in time to entrain for Chicago. . . . THEN back at the desk discussing problems of industrial hygiene with DR. F. R. HENRY and MR. W. A. FERGUSON, of Dayton, meeting again the problems of trying to understand the opinions of private practitioners with reference to the diagnosis of occupational disease. . . . AND sojourning in Pittsburgh and, because of the hotel difficulties, staying with

Statement of ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Industrial Medicine, published monthly at Chicago, Illinois for October 1, 1946. State of Illinois, County of Cook. —ss: Before me, a notary public in and for the state and county aforesaid, personally appeared A. D. Cloud, who, having been duly sworn according to law, deposes and says that he is the Publisher of Industrial Medicine and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit: (1) That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, A. D. Cloud, 533 Madison Street, Glencoe, Illinois; Editor, C. O. Sappington, M.D., 330 South Wells Street, Chicago, Illinois; Managing Editor, None; Business Manager, Stephen G. Halos, 605 North Michigan Avenue, Chicago, Illinois. (2) That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1% or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Industrial Medicine Publishing Company, 605 North Michigan Avenue, Chicago, Illinois; Charles Drueck, Jr., 58 East Washington Street, Chicago, Illinois; Stephen G. Halos, 605 North Michigan Avenue, Chicago, Illinois; A. D. Cloud, 533 Madison Street, Glencoe, Illinois. (3) That the known bondholders, mortgagees, and other security holders owning or holding 1% or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None. (4) That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. (5) That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above... (This information is required from daily publications only.) A. D. Cloud, Publisher. Sworn to and subscribed before me this 22nd day of October, 1946. (Seal.) Leonora E. Fladung. (My commission expires August 24, 1948.) (Note—This statement must be made in duplicate and both copies delivered by the publisher to the postmaster, who shall send one copy to the Third Assistant Postmaster General (Division of Newspaper and Periodical Mail), Washington, D.D., and retain the other in the files of the post office. The publisher must publish a copy of this statement in the second issue printed next after its filing.)

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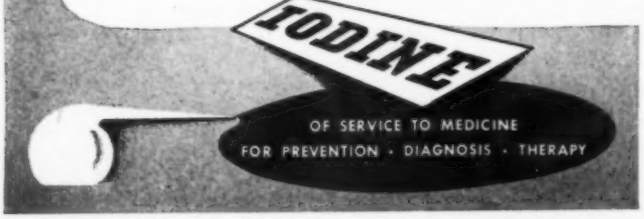

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my old friend DR. EDWARD MARBAKER, and later at lunch with JOHN MCMAHON and BILL YANT; and presenting a progress report on "Trends in Industrial Health Administrative Practices," and lunching at the Athletic Club with MESSRS. ABEL, LEWIS and COLIN RAMAGE; and then to the MSA cocktail party, for which was issued a blueprint showing how to get to the Athletic Club from the Mellon Institute, this being met with the rejoinders from many that blueprints should have been issued showing how to get home; and in the evening to the complimentary dinner for ADMIRAL JOEL T. BOONE so generously given by DR. W. D. BRAUN, there being present DRS. SHOUDY, SELBY, SHAEFER, HOLMBLAD, KUEHNER, WALMER, MARBAKER, HAZLETT, LANZA, and COMMANDER SHRONTS; and the next day having luncheon with DRS. MARBAKER and DAVIDSON at the Faculty Club of the University of Pittsburgh, and later visiting the Heinz Memorial Chapel, where greatly admiring the ornate glass windows 70 feet in height; and dinner in the evening with DR. E. THIIS-EVENSEN, of Norway, medical director of a chemical and fertilizer plant, and hearing of many problems, likewise thrilling tales of internment, deprivation, and finally family reunion. . . . AND speaking on health and dust problems in cement manufacture before the executives of the Portland Cement Association at the annual meeting, and later at at lunch with A. J. R. CURTIS of the Association and GIL GRIEVE of the National Safety Council. . . . AND then to Cleveland for the 74th annual meeting of the American Public Health Association and breakfasting with brother EMMETT and sister-in-law EDITH; and presiding at the Harvard Public Health Alumni luncheon at the University Club, welcoming the new members of the faculty, DR. ANDREW J. WARREN, DR. CHARLES F. WILINSKY, and DR. HUNTINGTON WILLIAMS—sitting with GENERAL STEPHEN SIMMONS and DEAN GORDON FAIR of the Engineering School, and seeing also MR. CRAWFORD of the Engineering School, DR. HUGO MUENCH, Professor of Bio-statistics and Assistant Dean, DR. HUGH R. LEAVELL, Professor of Public Health Practice, DR. JOHN SNYDER, Professor Public Health Bacteriology, and the new President of the Association, PROFESSOR ROY J. MORTON; there being much talk of a memorial for DR. EDWARD G. HUBER, former Dean; and later, cocktails with brother and sister-in-law and dinner at the annual banquet of the A.P.H.A.; and next day at libations, meeting CARL and LUCILLE BUCK, GEORGE PALMER, FRED FOARD, and the JOHN SIPPYS, and with the latter and BILL SHEPARD to dinner before entraining for Detroit. . . . AND in Detroit spending almost the whole day in conference with DR. C. D. SELBY at the General Motors offices, and seeing the new arrangement of office suites, meeting my old friend ANDY COURT, and many other old and new friends; and later to Birmingham for reunion with brothers BYRON and EMMETT and family; and next day to see the University of Michigan football team decisively defeat Wisconsin; and listening to very fine record music with nephew LEWIS, particularly enjoying Handel's Water Music Suite as played by Sir Hamilton Harty and the London Philharmonic, and of which Professor Michael so eloquently says "The legend fails, the truth remains. The piquancy vanishes, the beauty of the work is everlasting". . . . THEN back at the desk in time to check on various activities and many papers. . . . AND lecturing to industrial nurses in the first of a series of talks on the recognition and control of occupational diseases, there being much interest and discussion. . . . AND at the complimentary luncheon given for COLONEL K. E. MILLER, at the University Club, with reference to the completion of activities of the Chicago-Cook County Health Survey, and where SAMUEL A. GOLDSMITH, Chairman, Council of Social Agencies of Chicago, so graciously presided and so graphically defined a survey as "a physio-intellectual excursion". . . . AND now endeavoring to accommodate convenience to "the shape of things to come," of which in later notes. . . .

SUBJECT INDEX
Industrial Medicine, 1946—Volume 15, Numbers 1-12

ABSENTEEISM
—Influenza vaccination (Dec.) 676
—Sunburn (May) 341
ACCIDENTS
—Neuropsychiatric aspects (Feb.) 96
—Standards for analyzing (Sept.) 523
Adrenal, gonad, pituitary inter-relationship (Oct.) 591
Age, key seen in veins, not arteries (May) 368
Air analysis, instruments of (Aug.) 477
Aluminum therapy, silicosis (June) (Sept.) 417, 527
Ambulation, early, wound healing (Oct.) 591
Amputation stump (Dec.) 677
Ankles, sprained (Oct.) 594
Antibiotics, newer, status (July) 434
Antimony in biological material (Aug.) 477
Arc furnace hazard, silica (Jan.) 14
Arthritic patients, observation (Feb.) 100
ARTHRITIS (Feb.) 159
—Compensation claims (Nov.) 626
Aspects of mass radiography (Aug.) 473
Asphyxia, respiratory depression (Nov.) 640
Autonomic nervous system (Oct.) 592
Back, physical capacities (Nov.) 639
Backache (Nov.) 641
Basovascular spasm (Aug.) 481
B.C.G. vaccine, tuberculosis (Oct.) 592
Beryllium poisoning (Jan.) 68
"Better Book," editorial (Apr.) 276
Biological material, antimony in (Aug.) 477
Blind, placement of (July) 466
Blood and neurologic studies (June) 393
Bone, cartilagenous tumors (Oct.) 593
BOOK REVIEWS
—"Allergy" (Feb.) 141
—"Artists at War" (Feb.) 139
—"A Blind Hog's Acorns" (May) 346
—"Clinical Electrocardiography" (Apr.) 296
—"The Doctor's Job" (Mar.) 234
—"General and Plastic Surgery" (Feb.) 141
—"Industrial Toxicology" (Dec.) 698
—"Industry, Tuberculosis, Silicosis and Compensation" (Sept.) 531
—"Job Placement of the Physically Handicapped" (July) 461
—"Mass Radiography of the Chest" (Mar.) 238
—"Medicine in Industry" (Mar.) 198
—"The 'Nervous' Veterans" (Feb.) 139
—"Nursing in Commerce and Industry" (Mar) (Aug.) (Dec.) 198, 499, 698
—"Patients Have Families" (Mar.) 234
Bronchiectasis, non-disabling (Oct.) 595
Byssinosis (Nov.) 635
Cancer of the breast (Oct.) 592
Cardiac valve, traumatic rupture (July) 436
Cardiovascular impairments (July) 442
Cartilage grafts (Oct.) 593
Cartilagenous tumors of bone (Oct.) 593
Caterpillar Tractor Co., mental hygiene (Mar.) 179
Central States Society (Apr.) 256
Chemotherapy, traumatic wounds (Feb.) 87
Chest conditions simulating silicosis (June) 376
Child service centers (Mar.) 239
Coal miners, silicosis (Feb.) 161
Coal mines, health and safety in (May) 346
Cobalt (Dec.) 694
Code of ethics, industrial physician (Nov.) 654
COLDS
—Prevention drive (Mar.) 238
—Research on cause (Mar.) 196
Colles' fractures (Dec.) 685
Colon, injury to (Jan.) 68
Color vision in industry (July) 425
Community practitioner (Mar.) 187
Company relationships (July) 464
Compensable hernia (Jan.) 5
Compensation claims, arthritis (Nov.) 626
CONFERENCE
—General Motors Medical (Oct.) 565
—Industrial Dentists, Am. Ass. (Apr.) 271
—Industrial Health (Jan.) 39
—Industrial Health (Aug.) 472
—Industrial Health, national (Apr.) 268
—scientific exhibits (Apr.) 272
—technical exhibits (Apr.) 273
—Industrial Hygiene (Jan.) 23
—Industrial Hygiene Ass., Am., (Apr.) 270
—Industrial Hygienists, Gov. (Apr.) 268
—Industrial Nurses, Am. Ass., conf. (Apr.) 271
—Industrial Physicians, Surgeons, Am. Ass. (Apr.) 268
—Rocky Mountain Industrial Health (Sept.) 531
Consultations, psychosomatic (Jan.) 1
CONTROL
—Dermatitis (Feb.) 85
—Radioactive energy (Aug.) 485
—Radium painting (Feb.) 170
Coordination of industrial hygiene (Aug.) 475
Cornell-Caterpillar program, editorial (Mar.) 202
Cutaneous manifestations (May) 367
Dangers of petroleum solvents (Aug.) 483
"Dead hand" (July) 465
DENTAL
—Program, industrial (Feb.) 113
—Review survey (Aug.) 483
—Sequelae, etiology (May) (Aug.) 339, 484
DERMATITIS
—Control (Feb.) 85
—Industrial, paraprol (Jan.) 13
—Fungous infections (Oct.) 591
—Nickel, chrome, paraprol (Dec.) 681
—Preventive methods (Feb.) 174
—Due to trichlorethylene gas (June) 389
Dermatologic infections, use of penicillin (Oct.) 569
DERMATOSES
—Industrial (Aug.) 481
—Occupational (Feb.) 162
Diagnosis, mouth infection, radiographs (Jan.) 9
Disability, traumatic (Jan.) 68
Disabled personnel, government employment (Sept.) 524
Disabled veterans, Vet. Admin. plan (Sept.) 526
Disease, trauma and (Oct.) 575
"Doctor in Industry," film (Apr.) 264
Dr. Pilgrim 22, 115, 201, 263, 344, 395, 446, 499, 532, (15, Oct.), 658, (7, Dec.)
Drainage, surgical (Feb.) 88
DUST
—Manganese, hazard (June) 393
—Stone crushing (Feb.) 165
DYSMENORRHEA (Oct.) 594
—Edrisal (Apr.) (Dec.) 262, 679
—Treatment (Nov.) 632
Edema (Nov.) 636
Edrisal, dysmenorrhea (Apr.) (Dec.) 262, 679
Effects of reconversion (Aug.) 507
Electric shock, neurological manifestations (Oct.) 591
Engineering, industrial (Sept.) 520
England, factory medical center (Mar.) 230
English doctors visit U. S. (Jan.) 41
Emotional first aid (May) (July) 336, 419
Employees, periodic re-examination (Oct.) 566
Epidemiology of streptococcal infections (Oct.) 589
Epilepsy and job placement (Jan.) 51
Ethyl dichloride, toxicity of (Aug.) 482
Etiology of dental sequelae (May) (Aug.) 339, 484
Evansville industrial x-ray survey (Apr.) 303
EXAMINATIONS
—Industry (Feb.) 161
—Periodic re-examination (Oct.) 566
—Preliminary physical (Feb.) 143, 177
—Steel (Feb.) 159
—X-ray, pre-placement (May) 319
Eye injuries, common (Dec.) 692
Facilities, health (Jan.) 15
Factory medical center, England (Mar.) 230
Finger-tips, sore, protection (Apr.) 304
First aid, emotional (May) (July) 336, 419
Fixation, fracture therapy (Feb.) 90
Fluorescent lighting (June) 417
Fracture problems, therapy (Feb.) 90
Fractures, radius, ulna (Dec.) 685
"Free choice," editorial (Feb.) 116
Free choice of doctors (June) 418
Fungous infections, dermatitis (Oct.) 591
Galvanized iron welding (July) 462
Gardner, Roy, editorial (Nov.) 644
Gardner-Caterpillar health plan (June) 389
General practitioner, industry (Feb.) 149
Gonad, pituitary, adrenal inter-relationship (Oct.) 591
Government, disabled personnel (Sept.) 524
Grafts, cartilage (Oct.) 593
Great Britain, industrial health (Feb.) 121
Hand, treatment of injuries (May) 323
HANDICAPPED
—Blind, placement of (July) 466
—Epilepsy, job placement (Jan.) 51
—Government preparation for employment (Sept.) 524
—One-eyed worker (Apr.) 306
—Physically impaired worker (Mar.) 188
—Placing (Oct.) 597
—Productivity (Apr.) 298
—Veterans' Administration plan (Sept.) 526
Handicaps in industry (Feb.) 105
Hazard, arc furnace, silica (Jan.) 14
Hazards, mercury vapor (Aug.) 478
HEALTH
—Center, union (Dec.) 696
—Clinic, manufacturers (Jan.) 74
—Facilities (Jan.) 15
—Industrial, conference (Jan.) 39
—Insurance: attitude of management (Sept.) 522
—Compulsory (Apr.) 306
—Plan, garment workers (June) 389
—Program, Merchant Marine (May) 311
—Protection, outside help for (Sept.) 521
—Records in small plants (Aug.) 491
—Service, small plants (Feb.) 114
—State agencies (Sept.) 530
—Services, official agencies (Aug.) 474
Hematology, recent advances (Oct.) 590
Hematuria (Oct.) 594
Hernia, compensable (Jan.) 5
Hostile dependent behavior (May) 307
How I got into industrial practice (Jan.) 44
Hydrides, volatile (Aug.) 482
Hydrogen fluoride process (Aug.) 477
Hydrogen peroxide, finger-tips, protection (Apr.) 304
Hygiene, industrial, conference (Jan.) 23
Hyperthyroidism, treatment (Oct.) 591
Improved human relations (Aug.) 480
INDUSTRIAL
—Absenteeism, sunburn (May) 341
—Accidents, neuropsychiatric aspects (Feb.) 96
—Back, physical capacities (Nov.) 639
—Dental program (Feb.) 113
—Dentists, Am. Ass., conf. (Apr.) 271
—Dermatitis, paraprol (Jan.) 13
—Dermatoses (Aug.) 481
—Engineering (Sept.) 520
—Environment, human response to (Sept.) 510
—Health
—California symposium (May) 344
—conference (Jan.) 39
—Great Britain (Feb.) 121
—New Jersey bureau (Feb.) 172
—physical examination, preliminary (Feb.) 143
—safety in coal mines (May) 346
—silent values (Nov.) 638
—Hygiene Ass., Am., conf. (Apr.) 270
—conference (Jan.) 23
—construction in (Aug.) 477
—coordination of (Aug.) 475
—expansion of (Aug.) 473
—laboratory, role (Nov.) 628
—New Zealand (Mar.) 226
—official agencies, coordination (June) 381
—program, small plant (June) 371
—programs, expansion of (July) 423
—Hygienists, Gov., Nat. Conference (Apr.) 268
—Injuries, myopathies, treatment (June) 399
—Lung diseases, modern conceptions (July) 465
—Medical center (Feb.) 152
—Medical service (Mar.) 192
—Medicine
—industrial relations (May) 330
—nutrition (July) 466
—Philippines (Feb.) 129
—radioactive tracers, use (Jan.) 37
—surgery and medicine, Central States Society (Apr.) 256
—Mental problems of workers (May) 368
—Nurses, Am. Ass., conf. (Apr.) 271
—Physician
—community practitioner (Mar.) 187
—editorial 42
—role of (Sept.) 522
—Physicians, Surgeons, Am. Ass. conf. (Apr.) 268
—Psychiatry, Oak Ridge (Apr.) 243
—Relations in industrial medicine (May) 330
—Teamwork (Aug.) 486
—Worker, cardiovascular impairments (July) 442
—Workers, vitamin supplementation (Jan.) 77
—X-ray survey, Evansville (Apr.) 303
INDUSTRY
—Color vision, classification (July) 425
—Doctor in, film (Apr.) 264
—Dysmenorrhea, treatment (Nov.) 632
—Emotional first aid (May) 336
—Examinations in (Feb.) 161
—General practitioner (Feb.) 149
—Handicaps (Feb.) 105
—Medical service (Dec.) 686
—Medicine and, (Mar.) 194
—Mental hygiene unit, organization (Apr.) 259
—Nutrition and, editorial (July) 445
—Placement of blind (July) 466
—Psychoneurosis in (May) 325
—Psychosomatic consultations in (Jan.) 1
—Physically impaired worker (Mar.) 188
—Thirty years in (Apr.) 289
—Traumatic neuroses (Feb.) 109
—Tropical, sanitation (Apr.) 278
—Tuberculosis control, results (Oct.) 592
—Venereal disease (Mar.) 224
—Vibration syndrome in (Aug.) 481
—Vision (Mar.) 200
Inflammatory phlebostenosis (Mar.) 197
Influenza vaccination, absenteeism (Dec.) 676
INJURIES
—Eye, common (Dec.) 692
—Hand, treatment of (May) 323
—Colon (Jan.) 68
—Hepatic, from tetrachloride (July) 466
—Subsequent, law (Sept.) 522
Inspections, plant, value (Oct.) 579
Instruments of air analysis (Aug.) 477
Integration of medical services (Oct.) 589
Intravenous urography (Oct.) 594
Invitations to Propoganda, editorial (Mar.) 202
LABORATORY
—Procedures, use (Nov.) 621
—Role (Nov.) 628
LEAD
—Exposure from storage batteries (Aug.) 478
—Poisoning, occupational (Apr.) 253
Liver, disease, recent advances (Oct.) 589
Locomotion, human (Oct.) 594
Lowe, Donald Blair, editorial (July) 445
Lower back, x-ray examination (May) 319
LUNG
—Diseases, modern conceptions (July) 465
—Function, abnormal circumstances (Oct.) 590
Malingering (Apr.) 304
MANAGEMENT
—Attitude, health insurance (Sept.) 522
—Teamwork and (Aug.) 487
Managers, personality problems (July) 429
Manganese dust, hazard (June) 393
Manufacturers health clinic (Jan.) 74
Mass radiography (June) 391
Matching worker and job (Sept.) 518
MEDICAL
—Care, Merchant Marine (May) 311
—Centre, industrial (Feb.) 152
—Insurance, prepayment (Aug.) 497
—Program, modern plant (Oct.) 608
—Service in industry (Dec.) 688
—Services, integration (Oct.) 589
MEDICINE
—Occupational (Aug.) 479
—Research and (Oct.) 584
MENTAL
—Hygiene
—Caterpillar Tractor Co. (Mar.) 179
—Unit (Apr.) 259
—Problems affecting workers (May) 368
—Rehabilitation, worker (Sept.) 517
Merchant Marine, health program (May) 311
MERCURY
—Concentration (Aug.) 476
—Vapor hazards (Aug.) 478
Mercury-induced ventricular fibrillation (Aug.) 483
Metals, newer, toxicology of (Aug.) 474
Methionine and tetrachloride (July) 466
Methyl chloride, toxicity of (Aug.) 483
Michigan, safety engineering unit (Sept.) 514
Monomethylaniline and xylidene (Aug.) 483
Mouth infection, radiographs (Jan.) 9
Myelography with pantopaque (Oct.) 594
Myopathies, injuries, treatment of (June) 399
Nerve injuries, hand (May) 323
Neurologic studies, manganese dust (June) 393
Neurological manifestations, electric shock (Oct.) 591
Neuropsychiatric aspects (Feb.) 96
NEUROSES (Jan.) 78
—Traumatic (Feb.) 109
Neurosis, diagnosis (Oct.) 592
NEW JERSEY
—Health facilities (Jan.) 15
—Industrial health bureau (Feb.) 172
New York, small plant health plan (June) 376
New Zealand, industrial hygiene (Mar.) 226
Non-bacterial pneumonias (Oct.) 589
Nurse and teamwork (Aug.) 487
NUTRITION (July) 466
—Industry and, editorial (July) 445
Oak Ridge, industrial psychiatry (Apr.) 243
Observation, arthritic patients (Feb.) 100
OCCUPATIONAL
—Dermatitis (June) 389
—Dermatoses (Feb.) 162
—Disease
—catechism, editorial (Apr.) 276
—tetryl exposure (July) 428
—Medicine (Aug.) (Sept.) 479, 509
—Yale (Aug.) 505
Occupations, psychologically hazardous (May) 332
OCULAR
—Egects, radiant energy (May) 311
—Injuries, perforating (Sept.) 512
One-eyed worker, placement (Apr.) 306
Oral diseases, prevention (Mar.) 184
Outside help for health protection (Sept.) 521
Pantopaque, myelography with (Oct.) 594
PARAPROL
—Industrial dermatitis (Jan.) 13
—Nickel dermatitis, chrome sores (Dec.) 681
Passing of the pioneers (Apr.) 274
PENICILLIN
—Present status (July) 434
—Solution, crude (Apr.) 300
—Topical, newer uses of (Oct.) 569
Periodic re-examination of all employees (Oct.) 566
PERSONALITY
—Appraisal technique (Feb.) 81
—Problems (July) 429
PERSONNEL
—Post-war responsibility (June) 383
—Practices, 15 countries (Oct.) (Nov.) 595, 648
—Turnover (Dec.) 682
Petroleum solvents, dangers of (Aug.) 483
Philippines, industrial health (Feb.) 129
Phlebostenosis, inflammatory (Mar.) 197
PHYSICAL
—Capacities, back (Nov.) 639
—Examination, preliminary (Feb.) 143
—Rehabilitation, worker (Sept.) 516
Physically impaired worker (Mar.) 188
Pioneers, passing of (Apr.) 274
Pituitary, adrenal, gonad inter-relationship (Oct.) 591
Placement of blind (July) 466
Placing the handicapped (Oct.) 597
Plastics, toxicity (Feb.) 168
Pneumoconioses, diagnosis (Sept.) 528
Pneumonias, non-bacterial (Oct.) 589
Poisoning, beryllium (Jan.) 68
Polarograph in laboratory (Aug.) 475
Polyneuritic syndrome (Aug.) 481
Pre-payment as private enterprise (Aug.) 497
Preventive methods, dermatitis (Feb.) 174
Productivity of the handicapped (Apr.) 298
PROPAGANDA
—Editorial (Jan.) 42
—Invitations (Mar.) 202
PSYCHIATRY
—Emotional first aid (May) (July) 336, 419
—Hostile dependent behavior (May) 307
—Industrial, Oak Ridge (Apr.) 243

—Mental
—hygiene (Mar.) ... 179
—problems of workers (May) ... 368
—rehabilitation (Sept.) ... 517
—Neuropsychiatric aspects (Feb.) ... 96
—Neurosis (Oct.) ... 592
—Personality
—appraisal (Feb.) ... 81
—problems (July) ... 429
—Psychologically hazardous occupations (May) ... 332
—Psychoneurosis in industry (May) ... 325
—Value of (Apr.) ... 304
Psychologically hazardous occupations (May) ... 332
Psychoneuroses, veterans' hostile behavior (May) ... 307
Psychoneurosis, industry (May) ... 325
Psychosomatic consultations (Jan.) ... 1
Radiant energy, ocular effects (May) ... 311
RADIOACTIVE
—Energy, control of (Aug.) ... 485
—Tracers (Jan.) ... 37
Radiographs, mouth infection (Jan.) ... 9
Radiography, mass (June) (Aug.) ... 391, 473
Radium dial painting (Feb.) ... 170
Radius, ulna, fractures (Dec.) ... 685
Ramazzini, Bernardini (Aug.) ... 467
Ramazzini, Society meeting (May) (July) ... 343, 438
Raynaud's Phenomenon (July) ... 465
Reconversion, effects of (Aug.) ... 507
Red blood cell as immunologic tool (Oct.) ... 590
REHABILITATION
—Hostile behavior (May) ... 307
—Merchant Marine, health program (May) ... 311
Research, medicine and (Oct.) ... 584
Respiratory depression, asphyxia (Nov.) ... 640
Rh factor (Oct.) ... 590
Rheumatic diseases, inflammatory phlebostenosis (Mar.) ... 197
Riveters, Raynaud's phenomenon (July) ... 465
Road back (June) ... 383
Rochester, tuberculosis survey (Oct.) ... 591
Roentgen therapy, shoulder (Oct.) ... 594
Safety engineering unit, Michigan (Sept.) ... 514
Sanitation, tropical industry (Apr.) ... 278
Secondary closure of wounds (Oct.) ... 593
Service to employees, child centers (Mar.) ... 239
Shoulder, Roentgen therapy (Oct.) ... 594
Silent values, industrial health (Nov.) ... 638
Silica hazard, arc furnace (Jan.) ... 14
SILICOSIS
—Chest conditions simulating (June) ... 376
—Coal miners (Feb.) ... 161
—Pneumoconioses, the (Sept.) ... 528
—Therapy (Feb.) ... 159
—Aluminum (June) (Sept.) ... 417, 528
SMALL PLANT
—Health
—plan, New York (June) ... 376
—program (June) ... 371
—records in (Aug.) ... 491
—service (Feb.) ... 114
—Medical service (Mar.) ... 192
Spasm, basovascular (Aug.) ... 481
Standards for analyzing accidents (Sept.) ... 523
State agencies, health service (Sept.) ... 530
Steel, examinations in (Feb.) ... 159
Stone crushing, dust (Feb.) ... 165
Storage batteries, lead exposure from (Aug.) ... 478
Streptococcal infections, epidemiology (Oct.) ... 589
STRUMA
—Fibrosa, struma lymphomatosa, thyroiditis (Oct.) ... 593
—Lymphomatosa, struma fibrosa, thyroiditis (Oct.) ... 593
Subclavian structures (July) ... 426
Subsequent injury law (Sept.) ... 522
Sunburn and absenteeism (May) ... 341
Surgery, subclavian structures (July) ... 426
Surgical drainage (Feb.) ... 88
SYNDROME
—Polyneuritic (Aug.) ... 481
—Vibration (Aug.) ... 481
Systemic disease, cutaneous manifestations (May) ... 367
TEAMWORK
—Industrial (Aug.) ... 486
—Management and (Aug.) ... 487
—Nurse, the, and (Aug.) ... 487
Tendon injuries, hand (May) ... 323
Tetrachloride, injury, methionine (July) ... 466
Tetryl exposure (July) ... 428
THERAPY
—Fracture, fixation (Feb.) ... 90
—Silicosis (Feb.) ... 159
Thioglycolic acid, thioglycolates (Dec.) ... 669
Thirty years in industry (Apr.) ... 289
Thymol-barbital test (Apr.) ... 303
Thyroiditis, struma lymphomatosa, struma fibrosa (Oct.) ... 593
TNT, effect (Feb.) ... 161
TOXICITY
—Ethyl dichloride, of (Aug.) ... 482
—Methyl chloride, of (Aug.) ... 483
—Plastics (Feb.) ... 168
—Tungsten carbide, of (Aug.) ... 482
Toxicology of newer metals (Aug.) ... 474
Tracers, radioactive (Jan.) ... 37
Transperitoneal lavage, acute uremia (Oct.) ... 591
Trauma and disease (Oct.) ... 575
TRAUMATIC
—Disability (Jan.) ... 68
—Neuroses (Feb.) ... 109
—Rupture, cardiac valve (July) ... 436
—Wounds, chemotherapy (Feb.) ... 87
Trichlorethylene gas, dermatitis (June) ... 389
Triethylene glycol vapors (Aug.) ... 484
TUBERCULOSIS
—B.C.G. vaccine (Oct.) ... 592
—Results, industry control (Oct.) ... 592
—Medical students, in (Oct.) ... 591
Tumors of bone, cartilagenous (Oct.) ... 593
Tungsten carbide, toxicity of (Aug.) ... 482
Ulcer, varicose (Dec.) ... 688
UNION
—Health center (Dec.) ... 696
—Health plan (June) ... 389
Uremia, acute, transperitoneal lavage (Oct.) ... 591
Urography, intravenous (Oct.) ... 594
U. S. Employment Service (Sept.) ... 525
Utilization of aluminum, silicosis (Sept.) ... 527
Vapors, triethylene glycol (Aug.) ... 484
Varicose ulcer (Dec.) ... 688
Veins, not arteries, keys to age (May) ... 368
VENEREAL DISEASE (Mar.) ... 224
—Education (Mar.) ... 241
Ventricular fibrillation, mercury (Aug.) ... 485
Veterans' Administration plan (Sept.) ... 526
Veterans, hostile behavior (May) ... 307
Vibrating tools, "dead hand" from (July) ... 465
Vibration syndrome in industry (Aug.) ... 481
VISION
—Color, employee classifications (July) ... 425
—Fluorescent lighting (June) ... 417
—Industry, in (Mar.) ... 200
—Ocular effects, radiant energy (May) ... 311
—Perforating ocular injuries (Sept.) ... 512
Vitamin supplementation (Jan.) ... 77
Vocational rehabilitation, state bureau (Sept.) ... 524
Volatile hydrides (Aug.) ... 482
Wagner-Dingell Bill (Mar.) ... 204
Washington, industrial hygiene agencies (June) ... 381
Welders, symptoms of (July) ... 462
Welding, medical viewpoint (Mar.) ... 241
Wheat germ oil, treatment with (June) ... 399
WORKER
—His job, and (Sept.) ... 515
—Matching with job (Sept.) ... 518
—Mental rehabilitation (Sept.) ... 517
—Physical rehabilitation (Sept.) ... 516
WORKMEN'S COMPENSATION
—Free choice (June) ... 418
—Medical practitioners, ethics (Nov.) ... 654
Wound healing, early ambulation (Oct.) ... 581
WOUNDS
—Infected, surgical drainage (Feb.) ... 88
—Secondary closure (Oct.) ... 593
X-RAY
—Examinations, preplacement (May) ... 319
—Survey, industrial, Evansville (Apr.) ... 303
Xylidene, monomethylaniline and (Aug.) ... 484
Yale, occupational medicine at (Aug.) ... 505

AUTHORS

A., Victor Brito, M.D., (Feb.) ... 143
Allison, C. A., M.D., (Oct.) ... 592
Ant, M., M.D., (June) ... 399
Aston, Edward R., D.D.S., (Aug.) ... 483
Bahrs, George O., (Sept.) ... 522
Baker, Kenneth C., M.D., (June) ... 389
Baliff, Jack, (Feb.) ... 165
Barnes, E. C., (Aug.) ... 476
Barrett, William J. (June) ... 383
Bartle, Harvey, M.D., (July) ... 461
Barton, Preston N., M.D., (May) ... 319
Behrents, E. G., M.D., (Dec.) ... 685
Benjamin, John A., M.D., (Oct.) ... 594
Biernoff, Joseph, M.D., (Feb.) ... 109
Biram, James H., M.D., F.A.C.S., (May) ... 319
Blain, Daniel, M.D., (May) ... 316
Brehm, Paul A., M.D., (June) (Aug.) ... 391, 473
Bogan, Robert, M.D., (Nov.) ... 635
Bogardus, Eugene W., M.D., (Feb.) ... 149
Bowman, Karl M., M.D., (Sept.) ... 517
Breese, Burtis B., M.D., (Oct.) ... 589
Bridge, J. C., (April) ... 289
Bridges, Clark D., (Jan.) ... 51
Brodman, Keeve, M.D., (March) (April) ... 179, 259
Brown, Herbert R., Jr., M.D., (Oct.) ... 591
Brown, Meyer, M.D., (Feb.) ... 139
Brown, Reeve M., M.D., (Oct.) ... 575
Brown, Robert L., M.D., (March) ... 188
Butsch, R. L. C., Ph.D., (March) ... 188
Calderone, Frank A., M.D., (June) ... 371
Cameron, D. Ewen, M.D., (May) ... 332
Cantril, Simeon T., M.D., (Jan.) ... 37
Case, James T., M.D., (March) ... 238
Chirico, Frank N. (Aug.) ... 477
Cholak, Jacob, M.D., (Aug.) ... 477
Clarke, Eric Kent, M.D., (April) ... 243
Connell, W. Ford, M.D., (July) ... 442
Cranch, A. G., M.D., (Feb.) ... 168
Craver, Bradford N., M.D., (Aug.) ... 485
Culpepper, William L., M.D., (Feb.) ... 90
Curtis, L. F., M.D., (Aug.) ... 485
Daily, William L., (Nov.) ... 654
Dart, Edwin E., M.D., (Aug.) ... 481
Davidson, J. M., M.D., D.P.H., (March) ... 226
Davis, Nathan Smith, M.D., F.A.C.P., (March) (April) ... 234, 296
Dierker, Hugh, M.D., (Oct.) ... 579
Dobbins, Thomas, M.D., (Jan.) ... 13
Donnelly, Veronica, R.N., (Aug.) ... 491
Dreessen, W. C., M.D., (Nov.) ... 621
Duncan, Perry E., M.D., (Sept.) ... 512
Durand, W. F., (Sept.) ... 520
Dwyer, Emmet, M.D., (Feb.) ... 152
Eadie, Gordon A., M.D., (May) ... 325
Englehart, Ernest E., M.D., (Nov.) ... 626
Ennis, George E., (Sept.) ... 523
Fairhall, Lawrence (Aug.) ... 474
Farner, Lloyd M., M.D., (June) (Aug.) ... 381, 475
Faught, Francis Ashley, M.D., (June) ... 393
Feiman, Edward M., M.D., (Jan.) ... 14
Felton, Jean Spencer, M.D., (Feb.) (Nov.) (Dec.) ... 129, 638, 682
Ferlaino, Frank R., M.D., (Oct.) ... 569
Fetterman, Joseph L., M.D., (Feb.) ... 96
Fischer, C. N., M.D., (July) ... 428
Frederick, William G., (Aug.) ... 482
Gage, Alfred, M.D., (April) ... 278
Garvey, Paul H., M.D., (Oct.) ... 591
George, Murray P., M.D., (Oct.) ... 594
Ghiselli, Edwin G., Ph.D., (Sept.) ... 518
Goldman, F. H., (Aug.) ... 475
Goldstein, Jacob D., M.D., (Oct.) ... 589
Goldstein, Louis A., M.D., (Oct.) ... 594
Greenburg, Leonard, M.D., (June) ... 371
Gresh, J. T., B.Sc.Eng., (Feb.) ... 85
Gurdjian, E. S., M.D., (Aug.) ... 481
Hamlin, L. E., M.D., (June) ... 376
Hanman, Bert, (Oct.) (Nov.) ... 597, 648
Hannon, J. W. G., M.D., (Sept.) ... 527
Hanson, Kenneth B., M.D., (July) ... 426
Hartz, N. W., (Aug.) ... 477
Hazard, W. G., (Jan.) (Feb.) ... 15, 172
Heacock, Lyman D., D.D.S., M.P.H., (March) ... 184
Heller, Edward P., M.D., (Feb.) (Sept.) ... 141, 531
Heppel, Leon A., M.D., (Aug.) ... 482
Hewitt, A. G., (Aug.) ... 487
Hicker, Harry B., (Sept.) ... 524
Himler, Leonard E., M.D., (Feb.) ... 81
Hindes, Hubert J., M.D., (April) ... 262
Hirshfield, John Winslow, M.D., (Feb.) ... 87
Horwitz, Harvey, M.D., (Feb.) ... 100
Hoyt, Lieut. Col. William, (July) ... 426
Hunter, F. W., (Sept.) ... 525
Irvin, E. A., M.D., (Jan.) ... 1
Jacox, R. J., M.D., (Oct.) ... 592
Johnson, William, M.D., (Dec.) ... 685
Joseph, Norman R., Ph.D., (Feb.) ... 100
Kaltreider, Nolan, M.D., (Oct.) ... 591
Kariher, Donald H., M.D., (Oct.) ... 590
Kehoe, Robert A., M.D., (Aug.) (Sept.) ... 480, 510
Kessler, Henry H., M.D., (Sept.) ... 516
Kettering, C. F., (Oct.) ... 584
Keutmann, E. H., M.D., (Oct.) ... 591
Kindred, John C., M.D., (May) ... 338
King, George S., M.D., (May) ... 343
Kohn, Lawrence A., M.D., (Oct.) ... 591
Koven, A. Link, M.D., (Nov.) ... 628
Kronenberg, Milton H., M.D., (March) (Aug.) ... 179, 480
Kutscher, Charles F., M.D., (May) ... 311
LaCorte, Augustin, M.D., (Feb.) ... 143
Langbord, Joseph A., M.D., (June) ... 389
Largent, E. J., (Aug.) ... 477
Law, Stanley G., M.D., (April) ... 243
Lawrence, John S., M.D., (Oct.) ... 590
Legge, Robert T., M.D., F.A.C.S., (July) (Aug.) (Sept.) ... 445, 467, 522
Leggo, Christopher, M.D., (March) (April) (May) ... 187, 243, 330
Levin, Oscar L., M.D., (Feb.) ... 141
Long, Charles-Francis, M.D., (Dec.) ... 679
Lott, George M., M.D., (July) ... 419
Malstrom, B. E., M.D., (Dec.) ... 685
Mason, Michael L., M.D., (May) ... 323
McCann, William S., M.D., (Oct.) ... 589
McCord, Carey P., M.D., (Dec.) ... 669
McCormick, Frank T., M.D., (Feb.) ... 88
Meade, Gordon M., M.D., (Oct.) ... 591
Meltzer, H., Ph.D., (July) ... 429
Meyer, Otto, M.D., (March) ... 197
Mider, Burroughs, M.D., (Oct.) ... 593
Millman, Nathan, M.D., (June) (Aug.) ... 371, 491
Misher, K. W., D.D.S., (Feb.) ... 113
Mittelmann, Bela, M.D., (March) ... 179
Murdock, H. D., M.S., (July) ... 428
Newquist, M. N., M.D., (Aug.) (Sept.) (Dec.) ... 479, 509, 676
O'Connor, Robert B., M.D., (Oct.) (Nov.) ... 608, 639
Ohlhausen, Capt. Sidney G., (Feb.) ... 105
Olson, Carl T., M.D., (Aug.) ... 499
Page, R. C., M.D., F.A.C.P., (Dec.) ... 676
Parker, Bennett R., M.D., F.A.C.S., (Feb.) ... 90
Perina, Arthur E., (Feb.) ... 165
Pommerenke, Wesley T., M.D., (Oct.) ... 594
Powdermaker, Florence, M.D., (May) ... 316
Price, O. W., (Sept.) ... 526
Priest, Walter S., M.D., (July) ... 434
Puck, T. T., M.D., (Aug.) ... 484
Quinn, Francis B., M.D., (Sept.) ... 524
Ramsey, Prof. George H. S., (Oct.) ... 594
Ritter, Wayne L., M.D., (Jan.) ... 5
Rizzo, Peter Cyrus, M.D., F.A.C.S., (Nov.) ... 642
Romano, John, M.D., (Oct.) ... 592
Samuelson, C. L., M.D., (Oct.) ... 566
Sander, O. A., M.D., (Sept.) ... 528
Sappington, C. O., M.D., Dr.P.H., (Jan.) (March) (May) (Aug.) ... 23, 198, 339, 484
Sawyer, William A., M.D., (Aug.) ... 485
Schilling, J. A., M.D., (Oct.) ... 593
Schilling, Richard, M.D., (Feb.) ... 121
Schmidt, Rudolph, (Feb.) ... 165
Schwartz, Louis, M.D., (Feb.) ... 174
Schwartz, R. Plato, M.D., (Oct.) ... 594
Scott, W. J. Merle, M.D., (Oct.) ... 592
Scott, W. W., M.D., (Oct.) ... 594
Scott, R. P., M.D., (Dec.) ... 681
Seifert, Harry E., (Aug.) ... 478
Shaw, Henry C., M.D., (Oct.) ... 591
Shepard, W. P., M.D., (Sept.) ... 521
Sievers, R. F., M.D., (Aug.) (Nov.) ... 481, 621
Smith, W. W., M.D., (Aug.) ... 483
Solomon, Alfred P., M.D., (May) ... 307
Spolyar, Louis W., M.D., (Aug.) (Sept.) ... 474, 530
Stabins, Samuel J., M.D., (Oct.) ... 593
Stambovsky, Louis (May) ... 341
Stein, Samuel C., M.D., (June) ... 389
Steinhausen, Theodore B., M.D., (Oct.) ... 595
Stern, Arthur C., (Feb.) ... 165
Strebel, Gustave A., Jr., (July) ... 425
Strong, Howard, (March) ... 194
Svirbely, Joseph L., M.D., (Aug.) ... 483
Swanker, Wilson A., M.D., (Nov.) ... 636
Syverton, Jerome T., M.D., (Oct.) ... 589
Thomas, Earle H., M.D., D.D.S., (Jan.) ... 9
Tiffin, Joseph, (March) ... 200
Toffelmier, Douglas D., M.D., (Dec.) ... 677
Townsend, Cyril M., (March) ... 230
Townsend, J. G., M.D., (July) (Aug.) ... 423, 473
Treon, Joseph F., M.D., (Aug.) ... 483
Van Raalte H. G. S., M.D., (July) ... 436
Viggiano, F. A., M.D., (Nov.) ... 632
Vonachen, H. A., M.D., (March) ... 179
Watrous, R. M., M.D., (Feb.) ... 139
Weber, L. F., M.D., (Aug.) ... 481
Webster, Stewart H., M.D., (Aug.) ... 482
Weider, Arthur, M.D., (March) ... 179
White, Cleveland J., M.D., (June) ... 389
Whitney, L. Holland, M.D., (May) ... 336
Wilentz, William C., M.D., (April) ... 253
Willard, Frank J., Jr., (Feb.) ... 170
Williams, Vincent T., M.D., (Oct.) ... 581
Winn, Grant S., (Aug.) ... 478
Wittmer, J. J., M.D., (Aug.) ... 497
Wolff, Harold G., M.D., (March) ... 179
Young, Forrest, M.D., (Oct.) ... 593
Young, Lawrence E., M.D., (Oct.) ... 590

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